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JOURNAL OF BOTANY,

BRITISH AND FOREIGN.

EDITED BY

BERTHOLD SEEMANN, PH.D., F.L.S.,

ADJUNCT OF THE IMPERIAL L. C. ACADEMY NATURÆ CURIOSORUM.

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VOLUME II.

With Plates and Woodcuts.

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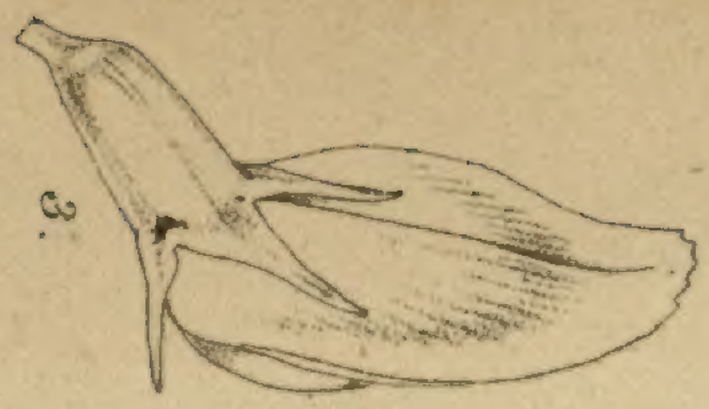

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THE

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ON THE PURPLE TREFOIL FOUND IN SCILLY.

By C. C. Babington, M.A., F.R.S.

(Plate XIII.)

It has been thought advisable to give a figure of the very pretty Trefoil found in the Scilly Isles by Fred. Townsend, Esq., in June, 1862, and first noticed at p. 216 of Vol. I. of this Journal. Not that we are able or desirous to distinguish it specifically, although when first seen we thought it might be distinct; for no characters seem to exist for separating it from the *Trifolium repens*, Linn.; indeed, had the flowers been pale, it is hardly possible that any transient doubt concerning their specific identity could have arisen. The singularly dark tint acquired by the upper parts of the vexillum and alæ renders the flowers so remarkable and so beautiful as to attract the attention of persons who are comparatively unobservant in botanical matters. Different, however, as these elegant flowers seem from the white or whitish flowers of *T. repens*, we need only go into the next crop of White Clover to obtain an abundance of tinted flowers. Certainly our fields do not furnish such deeply-coloured and ornamental flowers as are possessed by the plant from Scilly, but a considerable approach is made to them. The coloured flowers of the true *T. repens* are rather "more or less deep pink or rose-purple," as described by Lowe ('Flora of Madeira,' 150), than deep purple, as the Plate will show that they are in the plant now figured. It is also deserving of notice that in *T. repens* the colour is most marked on the back of the

vexillum, just above the calyx-tube, and is often confined to that part of the flower; but that in our plant the colour is deepest on the upper part of the standard, the portion corresponding with the patch of pink in true *T. repens* being quite pale. Also, the calyx of *T. repens* is often much tinged with pink on the back, and has blotches of that colour at the top of its tube: but the very deeply coloured corolla of the plant from Scilly has scarcely any (if any) discoloration on the back of its calyx, and very small and blackish-purple blotches at the top of its calyx-tube. The flowers of the two plants do not seem to differ in any other respect.

The leaflets of *T. repens* vary considerably in shape, and therefore distinctive characters cannot well be derived from them. Mr. Townsend says that the veins on the under side of the leaflets of his plant are very prominent; and that they are not so in *T. repens*. We do not place much confidence on this character; for the actual veins seem equally prominent in both plants, but the leaflets of that from Scilly appear to be very slightly plicate near the midrib, and thus the veins are rendered more apparently than really prominent.

The stem of this purple Trefoil is as decidedly both running and rooting, and also as solid, as that of true *T. repens*. We find very few *Trifolia* described as possessing such a creeping stem; in the account of the genus by Seringe in De Candolle's 'Prodromus' (vol. ii.), the only species allied to *T. repens* in this respect are *T. obcordatum*, Desv., from Buenos Ayres, *T. anomalum*, Schrank, of unknown origin, and *T. pallescens*, Schreb. Of these the *T. obcordatum* and *T. anomalum* are apparently very slight varieties of *T. repens*, unless the "foliis integerrimis" should be held to separate the former from its allies; and *T. pallescens* is incorrectly described. It is certainly cæspitose, and its stems do not root, and therefore cannot properly be called creeping (*repens*); indeed, usually they are not prostrate, and in the typical plant apparently never are so. The *T. glareosum*, Schleich., is perhaps a variety of *T. pallescens*. Its stems do not root, although they are more or less prostrate. Boreau considers *T. glareosum* as distinct from *T. pallescens*, and Reichenbach seems to have held the same opinion when he published specimens with those names in his Flora German. Exsiccata (nos. 1880 and 1881). They are plants found only at a considerable elevation on mountains, and therefore not likely to have any very close relationship to our almost maritime Trefoil from Scilly.

It is scarcely necessary to discuss the distinction of our plant from the *T. hybridum*, Linn., although they have been guessed to be identical. The fistulose, ascending, never-rooting stems of *T. hybridum* completely separate that species from our plant. We possess a specimen of *T. hybridum* from the original Linnæan locality mentioned in the 'Flora Suecica' (ed. 2. p. 258), viz. "Habitat in Uplandia inter Upsalam et Holmiam, ad Alsike et fere per totam viam." It is contained in the Herb. Normale of Fries (vii. 36). We should remember that the *T. hybridum* of Savi (Obs. in varias Trif. Sp. 92, and Botan. Etrusc. iv. 41) and that of Seringe (in De Cand. Prod.) is *T. nigrescens*, Viv.; and that the similarly-named plant of some other authors is *T. elegans*, Savi.

It is difficult to form any satisfactory opinion concerning the *T. repens* β. *rubescens* (Ser. in De. Cand. Prod.) which was obtained from near Geneva, unless we consider it to be the not unfrequent form of *T. repens* with purplish flowers. It may be the plant now under consideration, for the name would apply more correctly to this than the tinted flowers of the ordinary *T. repens*.

Our Plate is a representation of the living plant, roots of which were sent from Scilly, at the desire of Mr. Townsend, in May, 1863. The editor possesses living plants of it, and through his kindness we have one in the Botanic Garden at Cambridge. Our dried specimen was gathered by Mr. Townsend in the Island of Tresco, Scilly, flowering in June, 1862; but apparently the far-creeping stems continue to produce flowers during most of the summer. Mr. Townsend says, "the purple Trefoil was very abundant in the low wet sandy flats near the Tresco pool;" and he believes that he observed it in the other islands.

The *T. elegans*, Savi, has been occasionally introduced into this country with foreign agricultural seeds, but is scarcely able to stand the inclemency of our climate. See Brewer's Fl. of Surrey (p. 310), where the name is accidentally but erroneously attributed to Linnæus.

EXPLANATION OF PLATE XIII., representing *Trifolium repens*, var., from living specimens in the garden of Dr. Seemann.—Fig. 1. Part of stem, showing young root, petiole and stipules. 2. Side view of flower. 3. Back view of flower. 4. Fron view of flower. 5. Vexillum. 6. One of the alæ. 7. Carina. All magnified.

TWO NEW BRAZILIAN *AROIDEÆ*.

By H. Schott, Ph.D.

Philodendron brevilaminatum, Schott, n. sp.—Petiolus longus, antice planiusculus, aciebus hebetatis elevatis marginatus et exinde canaliculatus, postice alte convexus. Lamina fol. junioris stirpis cordato-ovata, cuspidulata, lobis posticis perbrevibus rotundatis, supra læte vel atro-viridis, infra pallida, adultioris subtriangularis, lobo antico latitudine laminæ breviori, posticis sinum basilarem vix ac ne vix monstrantibus, horizontaliter directis, ex lato-rotundato protensis. Costa infra alte prominens, supra canaliculata. Venæ inferiores subradiatim exsertæ, rectiusculæ, superiores magis curvulæ, utrinque 7–8, omnes supra cum pagina æquatæ, infra, exortu prominulæ, marginem versus deliquescentes. Pedunculus brevis. Spathæ tubus oblongo-ovoideus, utrinque sanguineus; lamina cymbæformis subacuminata, extus pallide virens, intus albido-flavens. Spadix spatha sat brevior, digitiformis, stipitatus, triente femineus. Ovaria et antheræ pallidissime ex flavo carneæ. Rhachis flosculorum sanguinea. Stigma ex roseo albidum. Ovarii loculamenta sub-5, multiovulata.—Brasilia, Ilheos, (*Archidux F. Maximilianus !*)

Philodendron æmulum, Schott, n. sp.—Petioli longi, canaliculati, margine crasso elevato aucti, dorso semitereti convexi, striis tenuissimis prominulis approximatis lineolati. Lamina fol. cordato-sagittata vel subsagittato-cordata, lobo antico plus minusve producto acuto vel sensim acuminato, lobis posticis sinu levi aperto vel apertissimo divergentibus subangulato-obtusatis, supra atroviridis, infra pallidior. Costa supra planiuscula, infra alte prominens. Venæ utrinque sub-8, supra planiusculæ, sulcis canaliculiformibus immersæ, infra longo tractu prominentes, infimæ sæpe basi convexæ, costulam in sinu latere exteriore pro parte denudatam formantes. (Folium juvenculæ apicem petioli versus vagina auctum, lamina basi in sinu loborum cuneatim deorsum ducta.) Spatha 7 pollices longa, tubo elongato angusto, extus virente et ferrugineo profuso tincto, intus albido, lamina lanceolata, apiculata, dorso viridi, antice albida. Spadix laminam tandem superans, pugioniformis, spica mascula quam feminea triplo longior. Ovaria viridia, stigmate albo, loculamentis 9–11, 3–4-ovulatis. Antheræ substramineæ.—Brasilia, Itaparica, (*Archidux F. Maximilianus !*)

ON THE ÆSTIVATION OF *CRITHMUM MARITIMUM*.

By Berthold Seemann, Ph.D., F.L.S.

Mr. J. T. Boswell Syme has drawn my attention to *Crithmum maritimum* as a second British Umbellifera having a truly *valvate* æstivation, and obligingly supplied me with fresh specimens of the plant. Mr. Syme is perfectly right in regarding the æstivation of *Crithmum* as valvate, and all those who have looked at the buds under the microscope have satisfied themselves on that point. The petals are inflexed at the apex, as is the case in many allied genera, but their edges are truly valvate. It is a matter of importance to ascertain the æstivation of all the plants regarded by us as Umbelliferæ and Araliaceæ, because, for systematic purposes, most useful characters are to be found in it; and as there is a vast number of species to be examined, it is desirable there should be a good many observers. I am more and more convinced that the only clear line between Umbelliferæ and Araliaceæ, or, as I should prefer calling the latter, Hederaceæ, can only be drawn by relying upon the characters derivable from the æstivation of the corolla. Not one of the distinctive characters usually assigned to the two Orders holds good, and in elementary books this state of things is extremely puzzling to the student. If, for instance, a beginner wished to find *Hydrocotyle* and *Crithmum* by means of the analytical key given in one of our leading local Floras, he could never hope to succeed. After getting to the neighbourhood of the Orders in which they are placed in that work, he would meet with the following enigma:—

"33. Petals imbricate in bud. 34.
Petals valvate in bud. 35."

Of course, having ascertained the petals to be valvate in bud, he would continue his search by turning to "35," and there find,—

"Fruit a berry. Styles several. Leaves alternate. Araliaceæ."

Now as neither *Hydrocotyle* nor *Crithmum* have a berried fruit and more than two styles, his search for the two genera by means of this analytical key would have come to an end. I have quoted this example, out of many, because it came ready to hand, and it illustrates the practical inconvenience arising from our neglecting the æstivation. The conspectus of the calycifloral Orders given in Hooker and Arnott's 'British Flora,' places the student in the same dilemma.

Systematic botanists who have dealt with the whole vegetable kingdom have been as unsuccessful in finding distinctive characters for the two Orders as our local botanists, and the confusion that is thus caused in general systematic works is embarrassing. After the grave errors introduced into the ordinal characters of Hederaceæ by Don, and copied by Bartling and De Candolle, had been corrected by Brown and Bennett in 'Plantæ Javanicæ,' it became evident that Umbelliferæ and Hederaceæ were not so distinct as had been supposed by botanists labouring under the belief that Don's errors were the result of true observations. Lindley, in his 'Vegetable Kingdom,' makes the following distinctions between the two Orders:—

"*Umbelliferæ.* Fruit didymous, with a double epigynous disk.

"*Hederaceæ.* Fruit not didymous, without a double epigynous disk, 3- or more celled. Pentamerous flowers. Corolla valvate. Leaves alternating, without stipules."

The principal distinctive characters here relied upon (the didymous or non-didymous fruit and the presence or absence of the double epigynous disk) do not stand the test of practical application. About one-half of all known Hederaceæ have a didymous fruit, and in many Umbelliferæ the disk is not double if the styles are closely united, there being in that instance only one disk, as is the case in most Hederaceæ. The pentamerous flowers are general in both Orders, tetramerous ones forming the exceptions. Alternate leaves are also a feature common to both Orders, opposite ones being again the exception. Stipules cannot be denied to many Hederaceæ, being, for instance, highly developed in *Tetrapanax papyrifera*, C. Koch, the rice-paper plant.

Unless some additional characters besides those derivable from the æstivation of the corolla can be found, it will scarcely be possible to make Hederaceæ more than a suborder of Umbelliferæ. The general name of Umbelliferæ might be retained for the whole Order, whilst that of Apiaceæ (following Lindley) might be adopted for one suborder and Hederaceæ for the other. The two suborders would occupy the same relative position as do Clematideæ and Anemoneæ in Ranunculaceæ, and Papilionaceæ, Cæsalpineæ, and Mimoseæ in Leguminosæ, all of which are distinguished by the æstivation. However, when the whole genera belonging here shall have been carefully examined, it may become necessary to establish even more suborders. In *Trachymene cærulea* (*Didiscus*, Hook.), the petals are vexillary in bud, exactly as

they are in Papilionaceæ; in *Aralia racemosa*, *Stilbocarpa polaris*, and a few others, the æstivation of the corolla is quincuncial. Both being different degrees of imbrication, we may, in the present stage of the inquiry, rest content with two suborders of Umbelliferæ being defined:—

1. *Apiaceæ.* Corolla variously imbricate in æstivation.
2. *Hederaceæ.* Corolla valvate in æstivation.

I prefer the name Hederaceæ because it is not an innovation, *Hedera Helix* is a widely diffused and very characteristic plant of the Order, and the few typical species at present retained in *Aralia*, having a quincuncial corolla, must be shifted to Apiaceæ.

In many, but by no means in all Apiaceæ, the carpels separate mechanically from the carpopods. In Hederaceæ the carpels also separate occasionally, but there are never any thread-like carpopods. So it may be stated that all Umbelliferæ with separating carpels and distinct carpopods are genuine Apiaceæ, but that not all Apiaceæ have separating carpels and distinct carpopods. But the systematic value of the carpopod or carpophorum is depreciated by the recent observations of Von Mohl, which tend to show that the carpophorum is not a distinct organ, but part and parcel of the carpels.*

Crithmum maritimum, as far as I have been able to learn from examining specimens of the fruit not yet quite ripe, has two carpels which do not separate nor are furnished with distinct carpopods; and this character, combined with the valvate nature of its corolla, point out the plant as a genuine Hederacea.

I may add that Corneæ are chiefly distinguished from Hederaceæ, according to most authors, by their tetramerous flowers and opposite leaves. But there are Corneæ with pentamerous flowers, for instance, *Griselina* and *Corokia*; and *Cornus alternifolius*, Linn., is a familiar instance of alternate leaves. Corneæ agree in every respect with He-

* "The different views [taken of the nature of the carpophorum of Umbelliferæ] are contradicted by a microscopic examination of the fruit, yielding as it does the result that a carpophorum distinct from the carpels and joined to them by accretion does not exist, but that it forms really a part of the carpels themselves, and, when the fruit is ripe, separates from them, and then only becomes apparently a separate organ. This upsets all the speculations as to whether the carpophorum is to be regarded as an axial formation or (as De Candolle explains it) as the petiole of the carpellary leaf. The true state of the case becomes evident if in different heights of the unripe fruit, transverse sections are made and these be compared with vertical ones."—Hugo von Mohl, "On the Carpophorum of Umbelliferæ," Bot. Zeitung, vol. xxi. (1863) p. 264.

deraceæ, except that, as the younger Agardh has pointed out, Hederaceæ, like Apiaceæ, have epitropous ovules, and Corneæ apotropous.*

ON THE INTRODUCTION OF PERUVIAN COTTON INTO INDIA.

By Clements R. Markham, Esq., F.R.G.S.

The numerous experiments in the cultivation of varieties of Cotton from other parts of the world, which have been tried under the auspices of the different Governments of India, will probably be considered to have some botanical interest. The object of course has been to discover the variety which will yield the most remunerative crop in each of the regions (differing widely from each other in climate, soil, and amount of rainfall) which form our Indian Empire. I have myself introduced the varieties of *Gossypium* indigenous to the valleys of the coast of Peru, and I propose to give a brief account of the results of the experiment, so far as it has yet gone.

While travelling in the Coimbatore and Madura Collectorates, in the southern part of the Madras Presidency, in the autumn of 1860, I was struck with the resemblance of the climate, in many respects, to that of the coast valleys of Peru. This part of India appeared to me to be admirably adapted for the cultivation of the valuable species of Cotton which are indigenous to Peru, while it seemed unlikely that North American cotton could ever be extensively raised to advantage in so dry a climate. The problem appeared to me to be the introduction of a cotton with a longer staple than that of the indigenous plant of India, and therefore better suited to the demands of Manchester, which will thrive in the exceedingly dry climate of the eastern side of the Madras Presidency; and it seemed likely that the Peruvian cotton would meet the requirements of the case. The staple of the Peruvian cotton has a mean length of 1·30 inches, Sea Island, 1·61, Brazilian, 1·17, New Orleans, 1·02, and indigenous Indian, 0·89.

The indigenous Peruvian cottons are of two kinds,—one, growing in

* Gemmulæ "sunt nempe in Araliaceis et Umbelliferis velut in Hamamelideis epitropæ, in Cornaceis vero (observavi gemmulas *Corni*, *Benthamiæ*, *Corokiæ* et his proximæ *Acubæ*) ut in Caprifoliaceis et Viburneis apotropæ." (J. G. Agardh, Theoria Syst. Plant. p. 303.)

Piura and other northern valleys, being a variety of *G. Barbadense*; and the other, some of which has been received from the Casma valley, with small seeds covered with a greenish-coloured fur, is a variety of *G. arboreum*. The plants are perennial, and were cultivated by the subjects of the Incas long before the discovery of Peru by the Spaniards. The ancient Peruvians irrigated their cotton-fields by means of channels conducted from the numerous lakes in the Andes, picked and cleaned the cotton, and wove it into cloths. The long strip of coast-line between the Andes and the Pacific Ocean, consists of a sandy desert, traversed by some sixty streams and rivers, with as many fertile valleys on their banks. The climate of this region is very peculiar, rain is unknown, and the northern part especially is exposed to a long period of excessive dryness. The dry season extends from November to May, but in the middle of the latter month a veil of mist begins to spread over sea and shore, which continues till October. The Cotton-plants grow in very sandy soil, the cultivation depending entirely on the extent of natural irrigation produced by the overflowing of the rivers between November and May. The plants yield a crop every six months, and they continue to yield for ten years and upwards, but require irrigation at frequent intervals.

Here, then, was a cotton commanding a high price in the English market, with a staple exceeding in length any of the North American kinds, except the "Sea Island," which nevertheless flourishes in a drier and equally hot climate to those of any of the indigenous Indian cotton districts, where the plant only yields a very short staple. It appeared to me very desirable that the plant should receive a trial in the dry and hot regions on the eastern side of the Madras Presidency, and also in Sind. In this view I was supported by the high authority of Dr. Wight, who expressed an opinion that it was in every way desirable that the Peruvian Cotton-plant should be extensively and perseveringly tried in the Carnatic, especially along the wide sandy flats bounding all the larger rivers and streams which intersect the country between the central ranges of hills and the coast.

In August 1862, I obtained a supply of cotton seeds from the Peruvian coast valley of Piura, which was immediately forwarded to Madras. Towards the end of the year a second instalment was received and forwarded, and in January, 1863, a third instalment of seeds from the valley of Casma was sent out. Subsequently, a fourth

instalment followed. These seeds were extensively distributed by the Madras Government, for experimental cultivation in most of the Collectorates, and some of the results have already been reported.

In Coimbatore the crop was unfortunately destroyed by worms, which attacked the roots; but this was simply an accident, which tells neither for nor against the success of the experiment, and a second trial will therefore be made in this Collectorate.

In Salem the seeds were given to Mr. Fischer, a well-known and very enterprising cotton-farmer. He reported, in May, 1863, that all the seeds germinated within a week, that the plants were irrigated abundantly, that he then had two hundred healthy and promising plants, three feet high, and that if in three years each plant yielded 2 lbs. of cotton, as they do in Peru, the experiment would be eminently successful. In the following August, however, Mr. Fischer expressed an opinion that the Peruvian cotton would not succeed as a remunerative crop.

In Cuddapah, as in Coimbatore, the crop was destroyed by rains and maggot.

In Kistna the seeds were raised by several native farmers, in different parts of the country, and the plants appear very promising.

In South Arcot the experiment was undertaken by Mr. Norfor. In July, 1863, after the plants had been eight months in the ground, he had 1200 very healthy plants three to eight feet high. He irrigates them by means of windmills, and reports that their cultivation gives little trouble beyond ploughing and watering,—adding, that if they only yield 1 lb. per bush, the value of his crop will be Rs. 600.

A sample of Peruvian cotton grown in the Kistna district has also been reported upon in Manchester, as having a fair staple, clean, soft, and fine, valued at 27*d.* per lb. in November, 1863.

Some Peruvian cotton seed was also sown in the sand flats or drifts to the north of Ennore, in the Madras district. The plants were watered until they were a few inches high, but were afterwards left to themselves between February and June, being dependent for nourishment on occasional rains, and on the moisture below the surface of the sand in which they were planted. The plants, at the date of the report, looked better than ever, and appeared as if they would last for three years, and continue vigorous till the last.

The experiment has established beyond any doubt that Peruvian

cotton will thrive upon these sand flats and drifts, forming the sea-board to the north of Madras, and the advantages of the northern canal for the transport of produce would be a further inducement to an extension of the experiments. But it is not likely ever to be a remunerative speculation, unless the cotton is grown with grain, to enable the grower to pay the existing land-tax. The seed was sown too late in the season to ensure a fair trial.

In North Arcot a crop was grown in a garden at Chittoor, cleaned by hand, and in June 1 lb. of cleaned cotton and 2 lbs. of seed were obtained. This sample of Peruvian cotton grown in India was reported upon, both by a manufacturer in Manchester, and by one of the principal cotton-brokers in London. The first authority reports that it is of excellent quality, and would meet with a ready sale; that it is the right thing in every respect, of good colour, right length of staple, and very strong. He considers it, if anything, rather superior to "New Orleans," which sells at 22*d.* per lb. The London broker also reports that it is a very useful description of cotton, with a long and strong staple, good colour, and very clean.

These results of the culture of Peruvian cotton in the Madras Presidency, have led the Board of Revenue to attach a high value to it, and they have received several applications for seed. I shall, therefore, forward additional supplies with as little delay as possible, and the Cotton Supply Association have taken steps to procure several tons of seed from Peru.

FLORULA ORCADENSIS.—A LIST OF PLANTS REPORTED TO OCCUR IN THE ORKNEY ISLES.

By H. C. Watson, Esq., F.L.S.

Full lists of plants have been published for the Hebrides, Shetland, Faroe, and Iceland; but hitherto no sufficiently full list of those found in the group of islets called "Orkney" has been placed on record, to complete the series of insular florules which serve to connect the botany of Britain with that of Scandinavia and boreal America. I do not know of any resident in Orkney who is qualified or likely to supply this desideratum in botanical literature by the publication of a *Flora*

Orcadensis. Although I have not visited the islands in person, serviceable materials have accumulated in my hands, such as may enable me to make out a list of the flowering plants and Ferns of Orkney which must be approximately complete; quite as much so, probably, as are the already published lists of those in the Hebrides and Shetland Isles.

No doubt, any botanist might now draw out such a list for his own use by carefully going over the pages of the three first volumes of the 'Cybele Britannica,' together with the tabulated summary of provincial distribution given in the supplement to the same work; and for several of the rarer species, he might find localities and authorities recorded in the 'New Botanist's Guide.' At last, however, his list thus made out would likely be less complete, and certainly less corrected, than the one which I now propose to give, founded upon the materials presently to be mentioned.

Many years ago, the late Dr. Gillies gave me a 'Flora Orcadensis' in manuscript, probably written somewhere about the year 1820, since many of the dated localities were observed in the years 1817 and 1818. This Flora is founded on his own observations, on those of Mr. Alexander Duguid, on the botanical remarks included in Neill's 'Tour in Orkney,' and "the remaining species taken from a list inserted in Barry's 'History of Orkney,' from the MSS. of the Rev. Mr. Lowe." Subsequently I purchased from Mr. Pamplin a packet of Orkney plants, collector unknown, quoted below as "Spec." On collating the labels of these dried plants with the manuscript Flora by Dr. Gillies, it became very clear that the little herbarium had originally belonged to him, and had been collected by himself and Mr. Duguid. While these specimens confirm the general accuracy of his nomenclature, they enable me to make some few needed corrections in the names used in the written Flora; and they also suggest explanations regarding some species reported by Lowe, such as must be deemed very unlikely to occur in Orkney. Unfortunately for this object, the collection is far short of completeness. In addition to these older materials, Mr. Boswell Syme has favoured me with notices of several species which had apparently escaped the researches of his predecessors.

In order to compress the subjoined list as much as possible, the special localities are omitted, and any needful comments will be given after the end of it. One of the personal authorities for the existence

of the species in Orkney will be added after the name of each, which is not authenticated by a specimen in the collection. As I am not in possession of a copy of Barry's work, the species enumerated therein, and not confirmed by one of the later and better authorities, must be cited from the written Flora by Dr. Gillies, where apparently they are placed solely on the authority of "Lowe," although it is highly probable that many of them were seen in the islands by Dr. Gillies himself, and that he has simply omitted to place his own name to the general indications of frequency and situation. The list includes few except familiar names of familiar plants, and consequently the names alone, without botanical authority for the specific names, are deemed to be sufficient.

1. Dicotyledons.

Thalictrum alpinum. *Spec.*
T. minus. *Lowe only.*
Ranunculus aquatilis. *Spec.*
R. Flammula. *Lowe.*
R. Ficaria. *Spec.*
R. acris. *Spec.*
R. repens. *Lowe.*
R. bulbosus. *Lowe.* Introduced?
Caltha palustris. *Lowe.*
Papaver dubium. *Lowe.*
P. Rhœas. *Lowe.*
Fumaria "capreolata." *Lowe.*
F. officinalis. *Lowe.*
Cakile maritima. *Spec.*
Thlaspi arvense. *Neill.*
Capsella Bursa-Pastoris. *Lowe.*
Camelina sativa. *Neill.*
Cochlearia officinalis. *Lowe.*
C. danica. *Lowe.*
C. Armoracia. *Lowe.*
Draba incana. *Spec.*
D. verna. *Spec.*
Cardamine pratensis. *Lowe.*
C. sylvatica? *Specimen?*
C. hirsuta. *Gillies.*
Nasturtium officinale. *Syme.*
Sisymbrium officinale. *Lowe.*
S. thalianum. *Spec.*
Sinapis arvensis. *Lowe.*
Raphanus Raphanistrum. *Lowe.*
Viola palustris. *Syme.*
V. sylvatica. *Syme.*
V. tricolor. *Neill.*
Drosera anglica. *Spec.*
D. rotundifolia. *Gillies.*
Polygala vulgaris. *Lowe.*
Silene inflata? *Lowe?*
S. maritima. *Spec.*
S. acaulis. *Syme.*
Lychnis Flos-cuculi. *Lowe.*
L. diurna. *Lowe.*
L. Githago. *Neill, Duguid.*
Sagina procumbens. *Lowe.*
S. maritima. *Syme.*
S. nodosa. *Spec.*
Spergula arvensis. *Spec.*
Lepigonum rubrum. *Duguid.*
L. marinum. *Spec., Neill.*
Honkeneja peploides. *Lowe.*
Arenaria serpyllifolia. *Lowe.*
Stellaria media. *Lowe.*
S. Holostea. *Neill.*
S. graminea. *Spec., Neill.*
S. uliginosa. *Spec., Gillies.*
Cerastium triviale. *Syme.*
C. glomeratum. *Flora Orcadensis.*
C. tetrandrum. *Neill.*
Linum catharticum. *Neill.*
Radiola millegrana. *Spec.*
Hypericum pulchrum. *Neill.*
H. perforatum. *Lowe.*

H. elodes. *Neill.*
Erodium cicutarium. *Lowe.*
Geranium sylvaticum. *Lowe.*
G. molle. *Lowe.*
G. lucidum. *Lowe.*
G. Robertianum. *Spec.*
Oxalis Acetosella. *Lowe.*
Medicago lupulina. *Syme.*
Anthyllis vulneraria. *Neill.*
Trifolium repens. *Lowe.*
T. pratense. *Lowe.*
T. medium. *Lowe.*
T. striatum. *Neill.*
T. procumbens. *Neill.*
Lotus corniculatus. *Lowe.*
Vicia Cracca. *Spec.*
V. sativa. *Lowe.*
V. sepium. *Gillies.*
V. (Ervum) hirsuta. *Lowe.*
Lathyrus pratensis. *Lowe.*
L. maritimus. *Flora Scotica.*
Orobus tuberosus. *Neill.*
Spiræa Ulmaria. *Neill.*
Dryas octopetala. *Syme.*
Geum rivale. *Spec.*
G. intermedium? *Spec.*
Potentilla anserina. *Lowe.*
P. Tormentilla. *Spec.*
P. Comarum. *Lowe.*
Fragaria vesca. *Neill.*
Rubus saxatilis. *Spec.*
R. fruticosus. *Neill.*
R. Idæus. *Neill.*
Rosa spinosissima. *Lowe.*
R. canina. *Spec.*
R. Doniana. *Flora Orcadensis.*
R. tomentosa. *Flora Orcadensis.*
R. "villosa." *Neill.*
Alchemilla vulgaris. *Spec.*
A. arvensis. *Spec.*
Pyrus Aucuparia. *Spec.*
Epilobium angustifolium. *Spec.*
E. tetragonum. *Neill.*
E. montanum. *Spec.*
E. palustre. *Lowe.*
Circæa alpina. *Duguid.*

Hippuris vulgaris. *Spec.*
Myriophyllum ——? *Neill.*
M. spicatum. *Syme.*
Callitriche verna. *Lowe.*
C. autumnalis. "*Anderson.*"
Peplis Portula. *Duguid.*
Montia fontana. *Gillies.*
Sedum Rhodiola. *Gillies.*
S. acre. *Neill.*
Saxifraga aizoides. *Neill.*
S. oppositifolia. "*Miss Boswell.*"
S. hypnoides. *Neill.*
Chrysosplenium oppositifolium. *G*
Parnassia palustris. *Neill.*
Hedera Helix. *Lowe.*
Hydrocotyle vulgaris. *Spec.*
Conium maculatum. *Neill.*
Helosciadium inundatum. *Neill.*
Ægopodium Podagraria. *Neill.*
Bunium flexuosum. *Gillies.*
Æthusa Cynapium. *Neill.*
Ligusticum Scoticum. *Neill.*
Angelica sylvestris. *Spec.*
Heracleum Sphondylium. *Lowe.*
Scandix Pecten. *Spec.*
Anthriscus sylvestris. *Neill.*
Sambucus nigra. *Lowe, etc.*
Lonicera Periclymenum. *Spec.*
Galium verum. *Lowe.*
G. palustre. *Spec.*, *Lowe.*
G. uliginosum. *Lowe.*
G. pusillum. *Syme.*
G. saxatile. *Lowe.*
G. Aparine. *Lowe.*
G. boreale. *Lowe.*
Valeriana officinalis. *Spec.*
Valerianella olitoria. *Spec.*
Scabiosa succisa. *Spec.*
Knautia arvensis. *Neill.*
Apargia autumnalis. *Spec.*
Hypochæris radicata. *Spec.*
Sonchus arvensis. *Lowe.*
S. oleraceus. *Lowe.*
Crepis virens. *Lowe.*
Hieracium Pilosella. *Neill.*
H. murorum. *Lowe.*

Taraxacum officinale. *Lowe.*
Lapsana communis. *Lowe.*
Arctium Lappa. *Lowe.*
Saussurea alpina. *Spec.*
Carduus palustris. *Syme.*
C. lanceolatus. *Lowe.*
C. arvensis. *Lowe.*
Centaurea nigra. *Spec.*
C. Cyanus. *Neill.*
Tanacetum vulgare. *Spec.*
Antennaria dioica. *Spec.*
Gnaphalium supinum? *N. B. G.*
G. sylvaticum. *Spec.*
G. uliginosum. *Spec.*
Tussilago Farfara. *Lowe*
Solidago Virgaurea. *Spec.*
Senecio vulgaris. *Lowe.*
S. sylvaticus. *Syme.*
S. Jacobæa. *Lowe.*
S. aquaticus. *Lowe.*
Bellis perennis. *Lowe.*
Chrysanthemum segetum. *Spec.*
C. Leucanthemum. *Lowe.*
Pyrethrum inodorum. *Syme.*
P. maritimum. *Neill.*
Achillea Ptarmica. *Lowe.*
A. Millefolium. *Spec.*
Jasione montana. "*Miss Boswell.*"
Lobelia Dortmanna. *Syme.*
Erica Tetralix. *Lowe.*
E. cinerea. *Lowe.*
Calluna vulgaris. *Spec.*
Azalea procumbens. *N. B. G.*
Arctostaphylos alpina. *Spec.*
A. Uva-Ursi. *Spec.*
Vaccinium Myrtillus. *Lowe.*
V. uliginosum. *Syme.*
Pyrola rotundifolia. *Flora Orc.*
Gentiana campestris. *Spec.*
G. Amarella. "*Miss Boswell.*"
Menyanthes trifoliata. *Spec.*
Convolvulus arvensis. *Neill.*
Veronica serpyllifolia. *Spec.*
V. scutellata. *Lowe.*
V. Anagallis. *Spec.*
V. Beccabunga. *Lowe.*
V. officinalis. *Lowe.*
V. Chamædrys. *Neill.*
V. hederifolia. *Lowe.*
V. agrestis. *Spec.*
V. arvensis. *Lowe.*
Euphrasia officinalis. *Neill.*
Bartsia Odontites. *Spec.*
Rhinanthus Crista-Galli. *Lowe.*
Melampyrum pratense. *Spec.*
Pedicularis palustris. *Lowe.*
P. sylvatica. *Lowe.*
Digitalis purpurea. *Lowe.*
Mentha aquatica. *Spec.*
M. arvensis. *Lowe.*
Thymus Serpyllum. *Lowe.*
Teucrium Scorodonia. *Spec.*
Ajuga reptans. *Spec.*
A. pyramidalis. *Syme.*
Lamium album. *Lowe.*
L. purpureum. *Lowe.*
L. intermedium. *Syme.*
L. amplexicaule. *Syme.*
Galeopsis Tetrahit. *Lowe.*
G. Ladanum. *Lowe.*
Stachys palustris. *Spec.*
S. ambigua. *Spec.*
S. sylvatica. *Lowe.*
S. arvensis. *Miss Boswell.*
Glechoma hederacea. *Neill.*
Prunella vulgaris. *Lowe.*
Myosotis cæspitosa. *Syme.*
M. arvensis. *Flora Orcadensis.*
M. versicolor. *Flora Orcadensis.*
Mertensia maritima. *Spec.*
Lycopsis arvensis. *Neill.*
Cynoglossum officinale. *Lowe.*
Pinguicula vulgaris. *Spec.*
P. Lusitanica (*or* "alpina"). *Lowe.*
Primula vulgaris. *Spec.*
P. veris. *Spec.*, *Gillies.*
P. Scotica. *Syme.*
Anagallis tenella. *Spec.*
Glaux maritima. *Lowe.*
Armeria maritima. *Spec.*
Plantago major. *Lowe.*
P. lanceolata. *Syme.*

P. maritima. *Neill.*
P. Coronopus. *Spec.*
Littorella lacustris. *Lowe.*
Chenopodium album. *Syme.*
Atriplex Babingtonii. *Syme.*
A. hastata, "patula." *Neill.*
A. angustifolia. *Syme.*
Beta maritima. *Neill.*
Schoberia m ritima. *Syme.*
Salicornia herbacea. *Syme.*
Polygonum viviparum. *Syme.*
P. Bistorta. *Neill.*
P. amphibium. *Gillies.*
P. Persicaria. *Spec., Gillies.*
P. Hydropiper. *Lowe.*
P. aviculare. *Lowe.*
P. Convolvulus. *Lowe.*
Rumex aquaticus. *Syme.*
R. crispus. *Syme.*
R. obtusifolius. *Lowe.*
R. conglomeratus. *Lowe.*
R. Acetosa. *Lowe.*
R. Acetosella. *Lowe.*
Oxyria reniformis. *Gillies.*
Empetrum nigrum. *Neill.*
Mercurialis perennis. "*Boswell.*"
Euphorbia Helioscopia. *Syme.*
Urtica urens. *Neill.*
U. dioica. *Lowe.*
Corylus Avellana. *Spec.*
Betula alba. *Spec.*
Populus tremula. *Gillies.*
Salix caprea. *Lowe.*
S. aquatica. *Neill.*
S. aurita. *Neill.*
S. repens. *Spec.*
S. arbuscula. *Neill.*
S. prunifolia. *Neill.*
S. Lapponum. *Neill.*
S. herbacea. *Duguid, Gillies.*
Juniperus communis. *Neill.*
J. nana. *Spec.*

2. Monocotyledons.

Listera cordata. *Spec.*
Orchis mascula. *Lowe.*
O. latifolia. *Neill, Lowe.*
O. maculata. *Syme, Lowe.*
Gymnadenia Conopsea. *Lowe.*
Habenaria albida. *Lowe.*
Iris Pseudacorus. *Lowe.*
Scilla verna. *Spec., Gillies.*
Narthecium ossifragum. *Lowe.*
Triglochin maritimum. *Spec.*
T. palustre. *Spec.*
Potamogeton pectinatus. *Lowe.*
P. filiformis. *Syme.*
P. pusillus. *Spec.*
P. compressus. *Lowe.*
P. perfoliatus. *Lowe.*
P. lucens. *Lowe.*
P. heterophyllus. *Spec., Syme.*
P. oblongus. *Spec., Syme.*
P. natans. *Lowe.*
Ruppia rostellata. *Syme.*
R. maritima. *Neill.*
Zannichellia palustris. *Syme.*
Zostera nana. *Syme.*
Lemna minor. *Syme.*
Typha latifolia. *Neill.* (Extinct.)
Sparganium natans. *Spec.*
S. ramosum. *Spec.*
Juncus effusus. *Lowe.*
J. conglomeratus. *Lowe.*
J. acutiflorus. *Syme, Spec.*
J. lamprocarpus. *Syme.*
J. supinus. *Syme, Neill.*
J. cœnosus. *Syme, Neill.*
J. bufonius. *Neill.*
J. squarrosus. *Syme.*
Luzula sylvatica. *Lowe.*
L. pilosa. *Neill.*
L. campestris. *Lowe.*
L. multiflora. *Gillies.*
Schœnus nigricans. *Syme.*
Blysmus rufus. *Syme.*
Scirpus lacustris. *Neill.*
S. Tabernæmontani. *Gillies.*
S. setaceus. *ows.*
S. fluitans. *Syme, Neill.*
S. palustris. *Spec., Syme.*
S. uniglumis. *Syme.*
S. multicaulis. *Syme.*
S. cæspitosus. *Spec.*

Eriophorum vaginatum. *Spec.*
E. angustifolium. *Spec.*
Carex dioica. *Syme.*
C. pulicaris. *Syme.*
C. arenaria. *Neill.*
C. stellulata. *Spec.*
C. paniculata. *Syme.*
C. vulgaris (*Fries*). *Spec.*
C. flava. *Spec.*, *Syme.*
C. extensa. *Neill.*
C. fulva. *Neill.*
C. binervis. *Gillies.*
C. distans. *Syme*, *Neill.*
C. panicea. *Syme*, *Spec.*
C. glauca. *Spec.*, *Syme.*
C. præcox. *Neill.*
C. ampullacea. *Spec.*
Phalaris arundinacea. *Syme.*
Anthoxanthum odoratum. *Syme.*
Phleum pratense. *Syme.*
Alopecurus pratensis. *Syme.*
A. geniculatus. *Spec.*
Agrostis canina. *Syme.*
A. vulgaris. *Spec.*, *Syme.*
A. alba. *Spec.*, *Syme.*
Ammophila arundinacea. *Neill.*
Phragmitis communis. *Spec.*
Aira cæspitosa. *Spec.*
A. flexuosa. *Spec.*
A. caryophyllea. *Syme.*
A. præcox. *Neill*, *Syme.*
Avena fatua. *Neill.*
A. strigosa. *Neill.*
A. pubescens. *Neill.*
Arrhenatherum avenaceum. *Neill.*
Holcus lanatus. *Spec.*
Triodia decumbens. *Syme.*
Molinia cærulea. *Spec.*
Catabrosa aquatica. *Lowe.*
Glyceria fluitans. *Lowe.*
G. maritima. *Neill.*
Poa annua. *Syme.*
P. pratensis. *Spec.*
P. trivialis. *Spec.*
Briza media. *Lowe.*
Cynosurus cristatus. *Spec.*
Dactylis glomerata. *Spec.*
Festuca bromoides. *Syme.*
F. ovina. *Spec.*
F. duriuscula. *Neill*, *Syme.*
F. rubra. *Lowe.*
F. elatior. *Neill.*
F. loliacea. *Neill.*
Bromus mollis. *Neill.*
Brachypodium sylvaticum. *Spec.*
Triticum repens. *Spec.*
T. junceum. *Syme.*
T. loliaceum. *Lowe.*
Lolium perenne. *Lowe.*
Hordeum murinum. *Lowe.*
Elymus arenarius. *Spec.*
Nardus stricta. *Syme.*

3. Ferns, etc.

Polypodium vulgare. *Lowe.*
P. Phegopteris. *Newman, edit.* 3.
Cystopteris fragilis.
Lastrea Filix-mas. "*Neill.*"
L. dilatata. "*Neill.*"
L. Fœnisecii. "*Anderson.*"
Athyrium Filix-fœmina. "*Neill.*"
Asplenium Trichomanes. *Gillies.*
A. marinum. *Syme.*
A. Adiantum-nigrum. "*Neill.*"
A. Ruta-muraria. *Spec.*
Scolopendrium vulgare. *Gillies.*
Blechnum boreale. *Spec.*
Pteris aquilina. *Syme.*
Hymenophyllum Wilsoni.
Botrychium Lunaria. *Syme.*
Ophioglossum vulgatum. *Lowe.*
Lycopodium clavatum. *Syme.*
L. annotinum. *Syme*, "*Neill.*"
L. alpinum. *Spec.*, *Syme.*
L. Selago. *Spec.*, *Syme.*
L. selaginoides. *Syme*, "*Neill.*"
Equisetum arvense. *Syme.*
E. sylvaticum. "*Neill.*"
E. palustre. *Syme.*
E. fluviatile. *Lowe.*
E. limosum. *Syme.*
Chara vulgaris. "*Neill.*"
C. hispida. "*Neill.*"

Some few plants are included in the list, the specific names of which can be given only in doubt. Thus, in the herbarium there is a specimen of *Cardamine* which I cannot positively name *C. sylvatica*, although more inclined to call it by that name than by the less precise name of *C. hirsuta*, which is so often used to include both forms or subspecies. *Silene inflata* is another doubtful name or plant. This and *S. nutans* are given in the Flora on authority of Lowe's list, while *S. maritima* is there adopted from Neill's 'Tour,' and it is also confirmed by a specimen. I can only guess here that *S. nutans* of Lowe intended the typical *S. inflata*, apart from *S. maritima*. *Geum intermedium* is a poor example, but seemingly nearer to the intermediate form than to *G. rivale*. Neill records *Myriophyllum verticillatum*, which must be deemed far the least likely of our native species, and Neill would hardly have mistaken *M. spicatum* for it. At the date of his Tour, the *M. alterniflorum* had not been distinguished in this country from the other two species; and since it is now known to occur in the Hebrides, in Sutherland, and other Highland counties, there seems a presumption in support of that one having been the species seen by Neill. Mr. Boswell Syme, however, has reported *M. spicatum* and not *M. alterniflorum*. The *Gnaphalium alpinum* of Lowe's list may perhaps have intended *G. supinum*, reported by Mr. Clouston; but some confirmation of this latter species in Shetland would be desirable. Lowe recorded the *Pinguicula alpina*, but *P. Lusitanica* has been suggested; neither of them unlikely, as both occur in the North Highlands.

Further, in addition to the species enumerated in the preceding list, there are still various others which have been reported as plants of Orkney, and which are included in the manuscript 'Flora Orcadensis,' usually on the sole authority of Lowe's list in Barry's History; some few of them from Neill's 'Tour' and other sources. Most of these are plants not at all likely to occur in those northerly isles, if we estimate that likelihood by what is known of their distribution and northern limits elsewhere in Britain; and, under such circumstances, the authority for them must be deemed botanically insufficient to convince.

That some of them have been enumerated simply through mistakes in nomenclature, is rendered yet more probable by the fact of corresponding misnomers being kept up or repeated at a later date, on the labels of the specimens before mentioned, apparently by Dr. Gillies or Mr. Duguid, or both. Thus, *Draba incana* in flower is there labelled

D. hirta, while there are also other examples in pod which are rightly labelled. *Drosera Anglica* is labelled *D. longifolia*, as is often the case elsewhere, although English botanists mostly apply this latter name to *D. intermedia*. *Hypochæris radicata* is labelled *Apargia hispida*; *Potamogeton pusillus* is labelled *P. gramineus*; *Scirpus cæspitosus* is labelled *S. pauciflorus*.

In other instances the names on the labels have been erroneous at first, corresponding with Lowe's nomenclature, and corrected subsequently into the right names of the accompanying specimens. Thus, *Veronica serpyllifolia* was first named *V. spicata*; *Sparganium natans* was named *S. simplex*; *Aira cæspitosa* was named *Agrostis capillaris*. In one instance, however, it would seem that the accuracy of Lowe's nomenclature has been wrongly disputed; namely, in that of *Elymus arenarius*, doubted by Neill and also in the Flora. There are two examples of this Grass in the little herbarium cited, which had been first labelled *Arundo arenaria*, and subsequently corrected by another pen into *Elymus*.

Further, it may be proper to remark here that some of the plants in each list, the admitted and the omitted species, ought to be looked upon as introduced species only. Thus, *Spartium scoparium* and *Ulex Europæus* are placed among the omitted species, although actually to be seen in Orkney, because it is expressly stated by Dr. Gillies, in his manuscript 'Flora Orcadensis,' that they are certainly introduced shrubs there. *Armoracia* and *Tanacetum*, admitted into the former list, can hardly be more than escapes from cultivation. The two *Fumarias* and several others are the ordinary annual weeds which accompany agriculture or horticulture widely over the earth.

Without going further into individual explanations as to the grounds on which they are severally rejected as inhabitants of Orkney, I proceed to enumerate the names of a considerable number of species which have been recorded as found in the isles, but which cannot be accepted as natives, or even established colonists, without some additional confirmation, which may perhaps be obtained for three or four of them.

LIST OF OMITTED SPECIES.

Ranunculus Lingua.
R. arvensis.
Draba hirta.
Cardamine impatiens.
Arabis alpina.
Viola odorata.
Drosera intermedia.
Silene nutans.
Sagina apetala.
Arenaria Norvegica.
Cerast. "tomentosum."
C. latifolium.

C. aquaticum.
Spartium scoparium.
Ulex Europæus.
Trifolium ochroleucum.
Ervum tetraspermum.
Orobus niger.
Potentilla argentea.
P. reptans.
Rosa arvensis.
Pyrus domestica.
Cicuta virosa.
Sium angustifolium.
Myriophyllum verticillatum.
Sedum Telephium.
Saxifraga cæspitosa.
Imperatoria Ostruthium
Apargia hispida.
Lactuca virosa.
Serratula tinctoria.
Carduus nutans.
C. crispus.
Anthemis Cotula.
A. nobilis (introduced?).
Veronica spicata.
Melampyr. sylvaticum.
Scrophularia aquatica.
Myosotis palustris.
Plantago media.
Atriplex laciniata.
Rumex maritimus.
Euphorbia "segetalis."
Salix "angustifolia."
S. "latifolia."
S. acuminata.
Orchis Morio.
Potamogeton gramineus
Sparganium simplex.
Juncus filiformis.
J. trifidus.
Scirpus pauciflorus.
S. acicularis.
Carex acuta.
Panicum Crus-galli.
Milium effusum.
Apera Spica-Venti.
Agrostis capillaris.
Ara alpina.
Aivena flavescens.
Polystichum Lonchitis.
Asplen. septentrionale.

NOTE ABOUT THE *PRIMULA VARIABILIS*, *Goup.*

There has been much discussion in France concerning a plant called ***Primula variabilis***, some observers believing it to be a truly distinct species, and others considering it as a hybrid between *P. veris* and *P. vulgaris*. It seems to be far from uncommon in France, inhabiting places where the above-named plants grow; but does not appear ever to have been noticed without the companionship of both of them. It is true that M. de Rochebrune states (Bull. Soc. Bot. de Fr. viii. 689) that he has found *P. variabilis* in a place where the *P. vulgaris* does not grow, and in others where *P. veris* is not found; but M. Godron has shown (Bull. x. 178) that the plant called *P. variabilis* by M. de Rochebrune is in reality the true *P. elatior* (Jacq.).

The result of the discussion in France seems to be that the *P. variabilis* is a hybrid between the Primrose and Cowslip, and that it is very variable in form, according as it approaches one or the other of its parents.

It is remarkable that the very same question agitated our botanists a few years since; but being discussed in works little known out of England, the same results have had to be arrived at independently by Continental observers. Most of that discussion will be found in the

first series of the 'Phytologist' (vols. i. and ii.). Mr. H. C. Watson especially took an active part in it, and to him we are chiefly indebted for the nearly unanimous opinion of British botanists, that the plant usually called Oxlip, and most erroneously often named *P. elatior*, is a hybrid between the Cowslip and Primrose. It is curious also to find that in France as well as England these hybrids have been confused with the true *P. elatior* (Jacq.).

My object in this note is not to reopen any part of what I believe to be a settled question, but to direct attention to the fact that long discussions have led to the same results in France and England. With very few exceptions, we are all now agreed that *P. veris*, *P. vulgaris*, and *P. elatior*, are distinct species; and that *P. variabilis* (Goup.), the *P. elatior* of many English collectors, is the name of an endless series of ever-varying hybrids between *P. veris* and *P. vulgaris*. C. C. Babington.

CORRESPONDENCE.

Native Country of Tecomaria (Tecoma) Capensis.

York, 23rd November, 1863.

Having read in the 'Journal of Botany,' Vol. I. p. 21, the suggestion of *Tecomaria (Tecoma) Capensis* being a naturalized plant in the Cape of Good Hope colony, and having travelled much there in 1838, 1839, and 1840, with my eyes open to its plants and their conditions,—I venture to state my conviction, that from the extensive range this beautiful shrub has, both within the Cape colony, and far beyond its frontier, on the eastern side of South Africa, extending even into isolated mountain copses, far from the habitations of civilized man, there can exist no reasonable doubt of its being an aboriginal native of that country. In Thunberg's time little was known of those parts of the country to the eastward, where it abounds. I do not remember seeing either it, or its frequent companion *Plumbago Capensis*, in the Cape Town district, or towards the west coast. I presume that when these two were named it was not because they grew wild near Cape Town, or the promontory called the Cape of Good Hope, but because they grew within the colony of that name; but both have a range of several hundreds of miles, especially on the eastern side of South Africa: and I am mistaken if I did not see *Plumbago Capensis* also by the side of the Brisbane river, in Queensland, Australia; but I had neither the opportunity of examining it nor of bringing away a specimen.

James Backhouse.

[The Queensland *Plumbago* is probably *P. Zeylanica*, common in tropical New Holland.—Ed.]

Inflammability of Dictamnus albus.

York, December 19, 1863.

In Vol. I. p. 345, of the 'Journal of Botany,' I read with interest the notice of the inflammability of the flowers of *Dictamnus albus*, and noticed that the writer came to the conclusion that the inflammability depended on minute reddish-brown glands on the peduncles secreting æthereal (by a misprint "etheric") oil. That this solution of the inflammability in question is correct I am certain, but it is not limited to the glands of the peduncles; the little round glands cover also the stems of the plant; and by applying a candle to the lower part of the plant, in a fine summer's evening, I have often obtained a sudden blaze, enveloping the stem, and rising considerably above the plant. The experiment can, however, only be successful once in a season, as the combustible glands are not reproduced on the same stems. The oil of these glands seems to give the plant its peculiar smell. Probably the red-flowered is the normal state of *Dictamnus albus*, and the white-flowered condition, from which I suppose its specific name is taken, an albino.

JAMES BACKHOUSE.

On the Position of Monttea, Reyesia, Platycarpum, and Henriquezia, in the Natural System.

Hammersmith, December 14th, 1863.

In M. Bureau's interesting memoir on *Monttea* and *Reyesia*, frequent mention is made of my genus *Oxycladus*, with a view to show that it does not belong to *Bignoniaceæ*. It will simplify the remarks I have to offer on this subject, if I admit at once that from the moment I saw plate 51 of Gay's work, it was evident to me that his *Monttea* is identical with my *Oxycladus*, for when I wrote my 'Observations on the *Bignoniaceæ*,' my knowledge of Gay's genus was only derived from the text of his 'Flora Chilena.' In like manner I first became satisfied that his *Reyesia Chilensis* is generically, if not specifically, identical with my *Pteroglossis laxa*, as any one may be convinced by comparing Gay's plate 52 with (by a singular coincidence) plate 52, vol. ii. of my Ill. So. Am. Pl. M. Bureau therefore accords with my view in relation to *Reyesia*, but we are at issue in regard to *Monttea* (*Oxycladus*), which I placed in *Bignoniaceæ*, where Gay had also located it; and although the former botanist agrees with the latter that both genera are intimately related, I can perceive little connection between them. Concerning the intimate affinity of *Reyesia* with the *Salpiglossideæ*, we have sufficient evidence by reference to the analytical details in Gay's plate, and in plates 51 to 56 inclusive of my work above mentioned; but in the comparison of these with my drawing of *Oxycladus* (Trans. Linn. Soc. xxi. plate 18) all analogy ceases. Here we observe a series of characters quite incompatible with the *Salpiglossideæ*, viz. opposite leaves, a corolla with quincuncially imbricated æstivation, didynamous stamens with a sterile fifth, anther-lobes though divaricated, not confluent at the summit, but united by a distinct connective, a stigma of quite a different

nature, a two-celled ovary becoming a nearly indehiscent nut, one-celled by abortion, and perfecting only a single seed, which is exalbuminous, with large fleshy cotyledons. I pointed out long ago the resemblance of this structure with *Platycarpum* and *Henriquezia*, genera also referred to *Bignoniaceæ*. M. Bureau lays much stress upon the structure of the seed as being contrary to the usual development in that Order, an inference which is true; but it is not less true that such a structure exists, as I have shown in *Tanæcium*, *Adenocalymna*, and other unquestionable genera of the family: these genera have large coriaceous seeds, not winged, an exalbuminous embryo with large fleshy cotyledons, and a small terete embryo placed in regard to them exactly as is shown in *Henriquezia* (Linn. Trans. xxii. pl. 53, fig. 7). There is therefore little that can militate against the admission of my tribe *Platycarpeæ* into the *Bignoniaceæ*, except the occasional suppression of one of the cells of the fruit, and the abortion of all the ovules except one, a circumstance not to be wondered at in *Monttea*, which grows in very arid and saline soils. M. Bureau proposes to maintain *Platycarpum* and *Henriquezia* as a tribe of the *Rubiaceæ* or *Loganiaceæ* (where you originally suggested they should be placed), but the total absence of albumen in the seeds, and their large thick cotyledons, are characters quite inconsistent with such a position. Another argument urged by M. Bureau against the admission of *Henriquezia* into the *Bignoniaceæ* is the presence of stipules, which he seems to think is incompatible with this family; but here he is unquestionably mistaken, for, as you are aware, they are not unfrequently developed to a large size, being in opposite pairs in each node, like sessile rounded leaflets, without the smallest indication of a petiole. The last remaining objection to the admission of *Henriquezia* is the nearly inferior position of its ovary at an early stage, which, however, in the course of its growth, becomes quite superior; but this fact is not fatal to the reception of the genus among *Bignoniaceæ*, however abnormal it may be. I have before pointed out a very analogous instance in true *Styraceæ*, where in most cases the ovary and fruit are quite superior; but in the *Halesieæ*, the ovary, at first almost superior, in the course of its growth becomes nearly quite inferior, but *Halesieæ* and *Pterostyrax* cannot, on that account alone, be separated from *Styraceæ* (see Contr. Bot. i. plates 29, 30, 31).

M. Bureau has objected to my hypothesis that in *Bignoniaceæ* the carpellary leaves are ovuliferous on the midrib, and he evidently considers that I have shown much ignorance of the ordinary laws of nature in forming a preposterous conclusion. It is clear to me, however, that the present state of our knowledge is not sufficient to establish the orthodox rule which M. Bureau seems to advocate, that in the normal formation of carpels, the development of the ovules must *necessarily* be upon their margins; indeed, we have proof to the contrary. In the instances admitted by M. Bureau himself, the carpels are ovuligerous on different parts of their surface, or rather on the reticulations of their nerves; then why may they not bear ovules on their midrib? If we put aside a prejudgment of the subject, the latter development will not appear more unnatural than the former. In a plurilocular ovary, it is not impossible that sometimes the midribs of the component carpels may unite in the centre, and, becoming

confluent, be there ovuligerous; the supposition is as admissible as that the ovuligerous margins meet in the axis, and it would be no easy task to offer a proof against the existence of the fact: it is clear that as regards the development of the fruit, the growth would be precisely the same under either hypothesis; in both cases the cells, as well as the placentæ, would in like manner stand opposite the lobes of the stigma, the dissepiments would equally correspond, and the dehiscence be the same, either from the resilience of the confluent margins, or the rupture along the median nervure of the carpels; but which of the two actually occurs in particular cases, we have no means of judging, except by analogy. Now analogy shows that both conditions can exist in nature. The received hypothesis is, that petals and stamens, as well as ovaria, are only so many modifications in the development of rudimentary leaves; it is known as the ordinary rule, that the stamens are placed with their backs exteriorly, with their faces turned towards the axis, or in other words introrse; but we know they are occasionally extrorse, with their backs turned towards the centre. If, then, the staminal normal leaflets be both introrse and extrorse, it is reasonable to suppose that the carpellary leaflets may be subject to the same conditions, and it cannot be said that I have violated the law of probability in applying this explanation in the case of *Bignoniaceæ*, where the circumstances attendant on the growth of the fruit cannot be accounted for on any other hypothesis. We have indeed something like proof of an analogous occurrence in the Brazilian genus *Vasconcella*, which has a 5-locular ovary with 5 sterile complete dissepiments, intermediate with which are as many parietal placentæ; also in *Cucurbitaceæ*, where 3 or 5 extrorsely-formed carpels, with their midribs meeting in the axis, while their inflected margins converge in pairs towards the circumference, assuming at first the appearance of parietal placentæ. From these placentæ, as well as from the whole surface of the dissepiments so formed, the numerous ovules are generated from long funicles similar to those of *Adansonia*. We have here instances proving that carpels are sometimes placed back to back, with their midribs directed towards the axis.

In regard to *Platycarpeæ*, it is immaterial in a practical sense which of the two hypotheses be adopted, for the result would be the same in either case in the development of the fruit; and if M. Bureau prefer to consider that the ovuligerous margins of the carpels meet in the centre, no evidence can be offered to contradict it, except that of analogy, with the view of placing the condition of its carpels in harmony with the other tribes of the family. That nature does not follow one undeviating rule is proved by other facts. The late Mr. Brown demonstrated that in *Orchidaceæ*, and I indicated many years ago that in *Burmanniaceæ*, contrary to the ordinary rule of structure, the placentæ alternate with the lobes of the stigma; this is likewise generally the case in *Iridaceæ*. This anomaly was accounted for by Mr. Brown under the very ingenious but not quite satisfactory hypothesis, that each lobe of the stigma is normally bifid, and that the lobes of the adjacent stigmata becoming confluent, they thus appear as if alternate, while in reality they are normally opposite to the placentæ.

Concerning *Monttea* and *Reyesia*, the evidence is certain that they belong to

two very different families. There can be no doubt that *Reyesia* (*Pteroglossis*) is a genus of the *Salpiglossideæ*, not belonging to *Scrophulariaceæ*, according to my view, but to *Atropaceæ*, a family intermediate between that Order and *Solanaceæ* (Ill. So. Am. Pl. i. 172). In regard to *Monttea* (*Oxycladus*), you will remember the discussion that took place on the subject ten years ago, when you suggested that the genus rather belonged to *Myoporaceæ* (Proc. Linn. Soc. ii. 269), while, on the other hand, notwithstanding its anomalous form, I contended for its association with *Bignoniaceæ* (*ibid.* p. 270). My reasons are there stated expressly, and I have since seen no argument that can alter this conviction. M. Bureau, however, conceives it should form a new tribe of the *Scrophulariaceæ*, osculant with the tribe *Antonicæ*, belonging to *Loganiaceæ*. But the want of albumen absolutely excludes the genus from the *Loganiaceæ* as well as from the *Scrophulariaceæ*, while it renders it admissible in *Bignoniaceæ*. M. Bureau points to *Wightia* as an exalbuminous genus of *Scrophulariaceæ*, but we have the authority of Mr. Bentham, one of the most learned botanists of our time, for attributing to that genus a cartilaginous albumen, though unusually thin ; it would indeed be a great anomaly to find a seed, with a very lax membranaceous testa, and a much shorter and thicker cartilagineous inner integument investing the embryo.

I have only to remark, in conclusion, that my *Pteroglossis laxa* must remain a synonym of *Reyesia Chilensis ;* but in regard to *Mónttea*, it appears to me a name far too close to *Móntia* to be sustained, both being pronounced nearly alike ; and in order to avoid confusion, I would suggest the retention of that of *Oxycladus* in preference, especially under the consideration that Gay's work, though bearing the date of 1849, was not actually published by any bookseller, but printed at the expense of the Chile Government, and not distributed till a long while afterwards. Walpers appears not to have heard of the genus before 1852. The details of my plant, obtained by me in 1825, were not published till 1851 ; but if M. Gay's name be preserved, then my plant, as a species distinct from that he has described, would bear the title of ***Monttea aphylla.***

JOHN MIERS.

NEW PUBLICATIONS.

Études sur les Genres REYESIA *et* MONTTEA, *et Observations sur la tribu des Platycarpées de M. Miers.* Par M. Édouard Bureau. (Reprinted from the Bulletin de la Soc. Bot. de France.)

In this paper M. Bureau has taken up several questions which have been agitated in this country. It will be remembered that Mr. Miers maintained that the genera *Platycarpum* and *Henriquezia* were Bignoniaceous, a view in which he was supported by Mr. Bentham,—or rather Mr. Bentham first expressed his belief that *Henriquezia* and the allied

Platycarpum were *Bignoniaceæ*, and Mr. Miers endorsed the opinion; whilst Dr. Seemann maintained that these two genera formed a transition between *Rubiaceæ* and *Loganiaceæ*. In the paper before us M. Bureau goes deeply into the subject, and believes with Dr. Seemann that *Henriquezia* and *Platycarpum* are really the connecting links between *Rubiaceæ* and *Loganiaceæ*, as are also *Mitreola* and *Mitrasacme*, all four of which M. Bureau would place in *Rubiaceæ* rather than in *Loganiaceæ*.

M. Bureau also objects to the tribe Platycarpeæ which Mr. Miers forms out of the genera *Platycarpum*, *Henriquezia*, *Oxycladus*, *Monttea*, and *Reyesia*, and would incorporate with *Bignoniaceæ*. *Reyesia*, from C. Gay's authentic specimens, he finds to be a *Scrophularinea*, closely allied to *Duboisia* and *Schwenkia*; but *Monttea* and *Oxycladus* he would form into a new tribe of *Scrophularineæ*. M. Bureau has not seen specimens of *Oxycladus aphyllus*, and the botanists of this country only knew *Monttea Chilensis* from the plate and description in C. Gay's 'Flora Chilena;' but it has long ago been suspected by Dr. Seemann that the two genera were one, and the excellent description which M. Bureau has just published leaves little doubt on that point. The two plants may even be specifically identical,—*Oxycladus*, though named *aphyllus*, having certainly leaves probably deciduous, if not caducous ones. However, even if waiving the point of identity, there can be no doubt that the two are sufficiently close together to make the question about their true position in the natural system an inseparable one. We do not think that botanists will follow M. Bureau in placing *Monttea* and *Oxycladus* amongst *Scrophularineæ*. M. Bureau seems to have overlooked the discussion on *Oxycladus*, which took place ten years ago at the meetings of the Linnean Society between Mr. Miers and Dr. Seemann (Proceedings Linn. Soc. 1853 and 1854, p. 269–273), where the former advocated the claims of *Oxycladus* as a *Bignoniacea*, and the latter as a *Myoporinea*. The whole is thus summed up in the publication alluded to:—

"Mr. Miers states that he sees no reason to alter his conviction as to the proper position of the genus in question. Dr. Seemann contends that *Oxycladus* is too anomalous in form to be admitted among *Bignoniaceæ* on account of its fruit, which is a hard monospermous nut, with the seed suspended from near the summit of the cell, and of its embryo, which has large fleshy cotyledons, while there are no wings developed on the testa; and maintains that on these grounds it rather belongs to *Myoporaceæ*, with which family it agrees better

in habit, having broom-like branches terminating in a spine, and especially with the genus *Bontia*, with which it agrees in its hard nut, and which it approaches in the country of its origin. Mr. Miers, on the other hand, believes that it is easy to show that *Oxycladus* presents far greater discrepancies in relation to the *Myoporaceæ* than to the *Bignoniaceæ*. In *Myoporaceæ*, in nearly all cases, the leaves are alternate [they are opposite in *Pholidia scoparia*, and in several species of *Myoporum*, Ed.]; the flowers have always didynamous stamens, without any rudiment of a fifth; the ovarium is only bilocular in two instances, which he has elsewhere shown (Ann. Nat. Hist. 2nd ser. xi. 439) are doubtful, or at least abnormal genera of the Order; in nine other genera the ovarium is distinctly four-celled, with a single ovule suspended from the apex of each cell, and this ripens into a four-celled ligneous indehiscent nut, with a seed in each cell. The only remaining case is *Bontia*, which differs from all others of this family in having originally a bilocular ovarium, but where by the subsequent growth and inflection of the placentæ, eight pseudo-cells are produced, each with a single suspended ovule. This ripens into a hard indehiscent eight-celled nut, each cell producing a single seed, with a thick osseous testa, which is often confluent with the sides of the cell. Mr. Miers's knowledge of this genus is derived wholly from the descriptions of authors, and he finds no observations of a more recent date than those of Gærtner and Jacquin; our evidence of its real structure is therefore imperfect, but enough is recorded to show that it is a very anomalous form, if it really belong to the *Myoporaceæ*. . . .

"The author next proceeded to indicate those points of structure in *Oxycladus*, which establish the relative value of its affinity to the *Myoporaceæ* or the *Bignoniaceæ*. In this genus, both the branches and rudimentary leaves are distinctly opposite [so are several *Myopora*, Ed.], as in *Bignoniaceæ*, in which family we find two other genera, where the branches terminate in spines, viz. *Catophractes* and *Rhigozum*: the flowers are bluish, a colour not met with in *Myoporaceæ*; they present a sterile fifth stamen, a circumstance almost constant in *Bignoniaceæ*, and never seen in *Myoporaceæ*; the anther-cells are distinct, and widely divaricated upon a large fleshy connective, as in *Bignoniaceæ*, not oscillatory, lunulate, and opening by a hippocrepiform fissure, and therefore almost one-celled, as in *Myoporaceæ*; the ovarium is seated upon a five-lobed fleshy disk, which never occurs in the latter family, though constant in *Bignoniaceæ*; it is completely bilocular, with about six ovules in each cell, suspended and attached by a ventral thread to a distinct flat dissepiment, and arranged in three superimposed pairs upon its opposite faces, in two lines parallel with the axis, a structure which offers a marked character in the *Bignoniaceæ*, and unknown in the *Myoporaceæ*; of these twelve ovules, all become abortive, with the exception of one; the fruit is therefore 1-locular and monospermous, presenting an osseous nut, with four deep furrows in the apex, and divisible to the base along these striæ into four valves, two of these sutures being more easily separable, and always corresponding with the margin of the persistent dissepiment, which is pressed against one side, and which distinctly exhibits on both faces its several abortive ovules, the ripened seed filling the whole capacity of the nut. In *Myoporaceæ*, whether the nut be 4-celled or by abortion 2-locular, the intervening space is always solid, and

perfectly indehiscent, leaving small circular cells, surrounded by thick ligneous walls, without showing any marks of division; there is no analogy whatever between this structure and that of *Oxycladus*. The absence of the alary expansion of the testa, so common in *Bignoniaceæ*, is urged as a reason for excluding this genus from that family, but the argument is not valid, where as in *Oxycladus* only one of the ovules becomes impregnated, and where it is thus left at full liberty to acquire the size and shape of the whole space of the cell. The want of wings in the seeds occurs however in other Bignoniaceous plants. . . . The last consideration as regards *Oxycladus* is not the least important; its seeds are exalbuminous, as in *Bignoniaceæ*, whereas in those of the *Myoporaceæ* the embryo is always contained within albumen."

On Marsilia and Pilularia. By Alexander Braun. ('*Ueber Marsilia und Pilularia*,' etc.). Reprinted from the Proceedings of the Berlin Academy, 1863.

This is an abstract of another addition to the long series of valuable memoirs which Professor Alexander Braun has presented to the Berlin Academy, and which is now published in hope that it may induce botanists to furnish the author with suggestions previous to the issue of the complete memoir, illustrated by figures, in the Transactions of the learned body before whom it was read. In this paper Professor Braun does the same for *Marsilea*, or *Marsilia*, as he writes it, and *Pilularia* as he has done on previous occasions for *Equisetaceæ*, *Chara*, *Isoëtes*, and other groups. Having made himself perfect master of the subject, he completely refutes those superficial observers who were ready to refer all the known species of *Marsilea* to *M. quadrifolia*, and all *Pilularias* to *P. globulifera;* and when the memoir itself shall have been published, we shall probably hear no more of the extreme variation to which a single aquatic plant like *Marsilea quadrifolia* is subject. The author disputes the correctness of the generally received idea that all water and swamp plants enjoy an extensive geographical distribution, by showing that amongst them similar differences prevail as amongst terrestrial species. For instance, while the *Characeæ* are generally widely diffused, most *Marsileas*, *Pilularias*, and *Isoëtes* are extremely local, a phenomenon partly explained by the size and weight of the macrospores.

The number of known species of *Marsilea* amounts to 37,—or 30, if a few less marked forms be lumped together, such as *M. mucronata* with *uncinata* and *vestita*, *M. Coromandelina* with *trichopoda*, *M. erosa* with *crenata*, *M. brachypus* with *gracilenta*, and *M. strigosa* with *pubes-*

cens. Of these, 4 species are found in Europe, Northern Africa and Asia, 6 in Southern Asia, 12 in Central and Southern Africa, including the Canaries, Mauritius, Bourbon, and Madagascar, 5 in Australia, 9 in North and South America, one of which is common to both North America and Europe, and 4 in the South Sea Islands, only two of which, however, are peculiar to them. All these species are arranged as follows :—

MARSILIA, *Vaill.*

A. Fruits numerous (8–20) placed on recurved peduncles in a single row far up the petiole, from the outer edge of which they spring, globose, without teeth.

1. *M. polycarpa*, Hook. et Grev. (*M. Brasiliensis*, Mart., forma minor.) South America, West Indies, Mexico, and Tahiti.

B. Fruits from 2–6, mostly 2 (exceptionally 1), seated on the base, or a little above the base of the petiole, more or less compressed, mostly oblong, with 2 teeth.

a. *Peduncles erect, for some distance, sometimes more than halfway up, grown together.*

2. *M. quadrifolia*, Linn. Temperate parts of Europe and Asia; in North America only known from Connecticut.

3. *M. macropus*, Engelm. (non Hook.). Texas.

4. *M. Brownii*, A. Braun (*M. quadrifolia*, R. Brown, Prodr.). New South Wales.

b. *Peduncles free, or at the base slightly grown together.*

α. *Peduncles erect or ascending.*

5. *M. diffusa*, Lepr. (*M. sarmentosa*, Bory; *M. superterranea*, Kunth; *M. erosa*, Kunze; *M. vulgaris*, Bory, Bojer). Tropical Africa and its islands.

6. *M. erosa*, Willd. (*M. quadrifolia*, floribus umbellatis, Klein; *M. quadrifolia*, Burm.; *M. minuta*, Linn., Mant.). Tranquebar, Pondicherry, Ceylon.

7. *M. crenata*, Presl (*M. microcarpa*, A. Braun; *M. minuta*, Blanco). Philippine and perhaps Hawaiian Islands.

8. *M. brachycarpa*, A. Braun. Pegu.

9. *M. brachypus*, A. Braun. Neilgherries.

10. *M. gracilenta*, A. Braun. Concan.

β. *Peduncles bent downwards.*

11. *M. deflexa*, A. Braun. Brazil.

C. Fruit solitary at the base of each petiole (more or less compressed, with or without teeth).

a. *Peduncles erect or ascending.*

α. *External skin of fruit not peeling off.*

12. *M. Coromandelina*, Willd. (*M. quadrifolia*, Burm.; *M. minuta*, β *Coromandelina*, Linn., Mant.; *M. minuta*, pedunculis unifloris longioribus filiformibus, Klein; *M. longipes*, Bory. Coromandel Coast.

13. *M. trichopoda*, Lepr. Senegambia.

14. *M. muscoides*, Lepr. Senegambia.
15. *M. uncinata*, A. Braun. Arkansas, Texas.
16. *M. mucronata*, A. Braun (*M. vestita*, Torr., *M. quadrifolia*, Ward). Misetta.
17. *M. vestita*, Hook. et Grev. Oregon, New Mexico.
18. *M. tenuifolia*, Engelm. Texas.
19. *M. villosa*, Kaulf. Hawaiian Islands.
? 20. *M. mutica*, Metten. New Caledonia.
? 21. *M. hirsuta*, R. Brown. New Holland.
22. *M. Drummondii*, A. Braun (*M. macropus*, Hook.; *M. villosa*, Brackenr.; *M. quadrifolia*, var. *hirsuta*, F. Mueller; *M. erosa*, var. *sericea*, F. Mueller; *M. sericea*, Kunze). Southern parts of New Holland, common.
23. *M. salvatrix*, Hanstn. (*M. Muelleri*, A. Braun). Southern parts of New Holland.
? 24. *M. angustifolia*, R. Brown. New Holland.
25. *M. Dregeana*, A. Braun (*M. quadrifolia*, a, c (et b?), Drége, Herb.). Cape of Good Hope.
26. *M. Capensis*, A. Braun (*M. quadrifolia*, β, Kunze, exclud. *M. biloba*, W.; *M. quadrifolia*, d, e, f, i, Drége, Herb.). Cape of Good Hope.
27. *M. Burchellii*, A. Braun (*M. minuta*, Burch.; *M. quadrifolia*, γ *Burchellii*, Kunze; *M. quadrifolia*, g, Drége, Herb.; *M. pusilla*, A. Braun). Cape of Good Hope.
28. *M. biloba*, Willd. (*M. quadrifolia*, h, Drége, Herb.). Cape of Good Hope.
29. *M. Ægyptiaca*, Willd. Egypt and Southern Russia.
30. *M. strigosa*, Willd. Southern Russia.
31. *M. pubescens*, Tenore (*M. quadrifolia*, Desf.). Mediterranean regions.
?32. *M. fimbriata*, Schum. et Thonn. Guinea.

β. *External skin of ripe fruit peeling off.*

33. *M. gymnocarpa*, Lepr. (*M. leiocarpa*, Bory; *M. pygmæa*, Lepr.). Senegambia.
34. *M. Nubica*, A. Braun. Cordofan.

b. *Peduncle bent downwards, straight or variously twisted, and often penetrating into the ground.*

35. *M. subterranea*, Lepr. Senegambia.
36. *M. distorta*, A. Braun. Senegambia.
37. *M. ancylopoda*, A. Braun. Ecuador.

We would remark that *M. polycarpa* was first collected in the Society Islands in the year 1769, by Banks and Solander, and that in their specimens, preserved in the British Museum, some of the leaflets are 2–4-lobed,—though in the same individual there are also quite entire ones. But there does not seem any specific difference between the Tahitian and the American specimens. According to Solander's Prim. Fl. Pacific. p. 371 (ined.), *M. polycarpa* is called Moëha by the natives

of Ulaitea; and Sidney Parkinson gives, tab. 190 of his unpublished 'Drawings of Tahitian Plants,' a fine coloured illustration of the species, taken on the spot. To this is attached Solander's manuscript name, *M. quadrifoliata*, and under that name the plant is fully described in Solander's manuscript volume just quoted. In the same herbarium we find that Robert Brown has substituted his manuscript name of *M. Austrasiæ* for *M. quadrifolia*, R. Brown, Prodr., and the specimens collected by himself in Port Jackson. *M. erosa*, Willd., is marked *M. dentata*, Roxb.; but we do not know whether Roxburgh's is merely a manuscript name, or was published in some Indian periodical. There are specimens with very minute leaves, collected by Aucher-Eloy in the East, and probably belonging to *M. Ægyptiaca*, not quoted by A. Braun under n. 37, *ancylopoda*. The names, "Quayaquil, James." are probably misprints for "Guayaquil, Jameson;" and there seems to be some confusion with regards to Geyer's specimens, the years when they were collected being probably quoted instead of the numbers. His n. 450 we take to be *M. vestita*, Hook. et Grev. The New Caledonian *M. mutica* may perhaps prove identical with the Vitian species, provisionally named *M. quadrifolia*, in Seemann's list. There are no specimens of *M. hirsuta*, B. Brown, and *M. angustifolia*, R. Brown, in the public collection, but through Mr. Bennett's kindness we have been able to examine those of Brown's private herbarium. There are specimens of *M. hirsuta* from Broad Sound and the Gulf of Carpentaria; their petiole and leaflets are hirsute, their fruit solitary, erect, ovate, compressed, and densely covered with long sericeous chestnut-coloured hair. None of the specimens of *M. angustifolia*, all of which were collected in the Gulf of Carpentaria, have fruit, and they look like young and starved specimens of *M. hirsuta*. The leaflets are cuneate-lanceolate, and either acute or dentate at the point, the leaflets are less covered with hairs than those of *M. hirsuta*, but there is the same tuft of brown sericeous hairs at the meeting-place of the petiolules, and also the long sericeous chestnut-coloured hair at the base of the petioles, and the rosettes, as in the species just mentioned.

Professor Braun concludes his valuable paper with an account of *Pilularia*, enumerating four species, viz.—

PILULARIA, *Vaill.*

a. *Peduncles erect.*

1. *P. globulifera*, Linn. Northern temperate regions of Europe and Asia.

b. *Peduncles bent downwards.*

2. *P. Novæ-Hollandiæ*, A. Braun. New Holland and Van Diemen's Land.
3. *P. Americana*, A. Braun. Arkansas.
4. *P. minuta*, Durieu. Southern Sardinia and Northern Africa.

BOTANICAL NEWS.

The Royal Society has awarded one of the Royal Medals to the Rev. M. J. Berkeley, M.A., F.L.S., in appreciation of his researches in Cryptogamic Botany, especially Mycology.

The Historic Society for Lower Saxony—Niedersachsen, as nearly the whole of northern Germany was formerly called—has offered a prize for the best essay "on the native plants of Lower Saxony, in their relation to the mythology and superstitions of the Old Saxons."

The third part of M. Teodore Caruel's 'Flora of Tuscany' has been published, and comprises the monopetalous Calycifloræ, the Corollifloræ, and the Monochlamydeæ. Part IV. will conclude this useful work.

M. Jordan has in preparation a work to be called, 'Icones Floræ Galliæ et regionum vicinarum reformatæ,' to be issued every two months, and to comprise coloured illustrations, with analysis, of the French species.

The Imperial L. C. German Academy Naturæ Curiosorum has lately conferred the degree of Doctor of Philosophy upon M. Ernest von Herder (the grandson of the great poet), one of the Conservators of the St. Petersburg Herbarium. The botanist Persoon and Dawson Turner were amongst the last on whom this honour was conferred by that body; and in resuming the conferring of degrees in medicine and philosophy, it is understood that no fees of any kind will be charged.

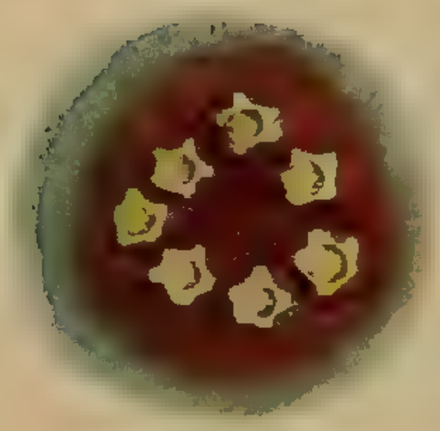
The 'Gardeners' Chronicle,' in noticing the extremely low prices fetched by the dried plants at the sale of the collections of the Linnean Society, remarks: "Upon the whole, these things may be said to have been given away. Was botany *in extremis*? or what was the matter?" We believe the commercially unsatisfactory result of this sale finds a ready explanation in the fact, that not sufficiently long notice had been given of the intended sale by means of public advertisements in the leading natural history journals.

The 'Botanists' Chronicle,' issued at 28, Manor Street, Chelsea, is a new penny serial, in 8vo, edited by Mr. Irvine, and intended to supply the less affluent friends of science with a cheap magazine, which will afford a medium for that kind of friendly intercourse, the giving and receiving help, mutual civilities, etc., beneficial to both the writer and the reader, the querist and the respondent.

Dr. Schweinfurth, of Berlin, has started for Egypt, with the intention of exploring botanically the Sinai peninsula and the Eastern shores of the Red Sea.

Mr. William Thiselton Dyer, from King's College, London, has been elected to the Physical Science Studentship at Christ Church, Oxford.

1a.

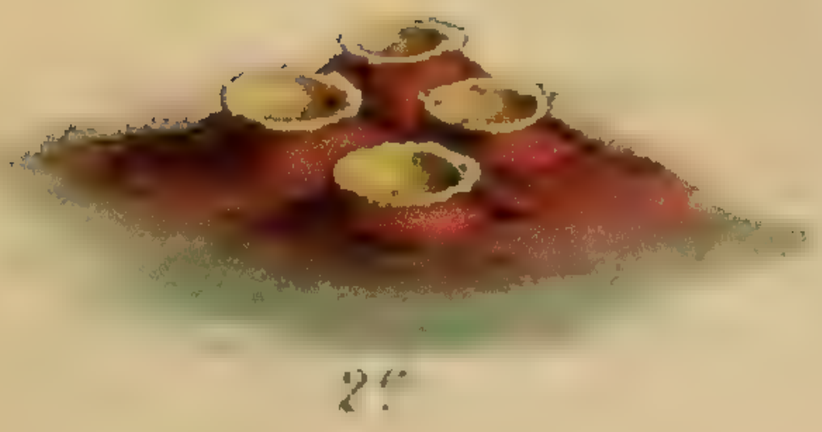


1b

1c

2a.

2b



2c

3a.

3b

W. Fitch del et lith

Vincent Brooks, Imp.

A SYNOPSIS OF THE BRITISH ÆCIDIACEI.

By M. C. Cooke, Esq.

(Plate XIV.)

This synopsis, including three or four new, or not hitherto described species, has been executed in the hope that it may lead to the re-discovery and identification of two or three others, doubtfully recorded as having been found in Britain. It is not impossible that some Continental types, as *Æ. Cruciferarum*, *Æ. Ligustri*, and *Æ. Melampyri*, may yet be met with.

Rœstelia, *Reb.*

Peridium elongated, at length opening by lateral fissures, or a terminal lacerated mouth. *Spermogonia* on the opposite surface, on the same or on different leaves.

1. *Rœstelia cancellata*, Reb. (Pear-leaf Rœstelia); spots yellow, then red, prominent; peridia split to the base into laciniæ, which remain united at the apex.—*Cooke, Index Fung. Brit. n.* 1407; *Gray's Nat. Arr. p.* 534; *Berk. Outl. p.* 336. Æcidium cancellatum, *Pers. Syn.* 205; *Eng. Flora*, v. *p.* 373. Cancellaria pyri, *Sow.* 410.—On pear leaves. Not very common.

2. *Rœstelia cornuta*, Tul. (Horn-like Rœstelia); spots rusty-brown; peridia cylindrical, slightly curved, yellowish-brown; sporidia greyish, at length brown.—*Cooke, l. c. n.* 1408; *Berk. Outl. p.* 336; *Gray's Nat. Arr. p.* 534. Æcidium cornutum, *Pers. Syn.* 205; *Sow. t.* 319; *Grev. Sc. Cr. Fl. t.* 180; *Johnst. Fl. Berw. p.* 207; *Eng. Flora*, v. *p.* 373.—On the under surface of the leaves of Mountain Ash. Not common. August.

3. *Rœstelia lacerata*, Tul. (Lacerated Rœstelia); peridia clustered in tufts, brown, elongated, splitting to the base in segments; sporidia light-brown.—*Cooke, l. c. n.* 1408; *Berk. Outl. p.* 336; *Gray's Nat. Arr. p.* 534. Æcidium laceratum, *Sow. t.* 318; *Grev. Sc. Cr. Fl. t.* 209; *Johnst. Fl. Berw. p.* 207; *Eng. Flora*, ii. *p.* 373. Æ. Oxyacantha, *Pers. Syn.* 206. Æ. Cratægi, *Purt. Midl. Fl.* iii. *p.* 570.—On the under surface of the leaves, and on the petioles and fruit of the Hawthorn. Not uncommon. May to July.

PERIDERMIUM, *Chev.*

Peridium elongated, at length bursting irregularly. *Spermogonia* scattered, conspicuous.

4. *Peridermium Pini*, Chev.; peridia oblong, scattered, large; sporidia orange, abundant; spermogonia vernal or autumnal, or both; spermatia large, white.—*Cooke, l. c. n.* 1410; *Berk. Outl. p.* 336. Æcidium Pini, *Pers. Syn.* 213; *Grev. Sc. Cr. Fl. t.* 7; *Eng. Flora*, v. *pt.* 2; *Fl. Devon. pt.* ii. *p.* 4.—On leaves and young branches of Scotch Fir. Common in Scotland, occasional in England. Summer.

5. *Peridermium elatinum*, Lk.; simple, immersed; peridia elliptic, pallid; sporidia orange.—*Cooke, l. c. n.* 1411; *Link, Obs.; Kze. et Sch. Deutsch. Schw. n.* 141; *Berk. Outl. p.* 336. Æcidium elatinum, *Alb. et Schw. Consp. n.* 337.—On Silver Fir, altering both foliage and ramification. Not common.

ÆCIDIUM, *Pers.*

Peridium seldom elongated, opening by a terminal mouth, surrounded by a fringe of recurved teeth, or when short bursting irregularly. *Spores* disposed in chains. *Spermogonia* on the same or the opposite surface, clustered or scattered, central or intermixed.

a. *Peridia scattered* (*not collected in tufts or clusters*).

6. *Æcidium leucospermum*, DC. (White-spored Æcidium); spots yellowish; peridia scattered, often covering the whole under-surface; sporidia white, ovate.—*Cooke, l. c. n.* 1412; *DC. Fl. Fr. p.* 239; *Berk. Outl. p.* 337; *Eng. Flora*, v. *pt.* 2. *p.* 371. Æ. Anemones, *Pers. Syn.* 212. Lycoperdon innatum, *With.* iv. *p.* 456. L. Anemones, *Pult. Linn. Tr.* ii. *p.* 311.—On both sides of the leaves of the Wood Anemone. Common. June.

7. *Æcidium quadrifidum*, DC. (Four-lobed Æcidium); spots brownish; peridia scattered, occupying almost the entire under-surface; sporidia brown, subglobose.—*Cooke, l. c. n.* 1413; *DC. Fl. Fr.* vi. *p.* 90; *Berk. Outl. p.* 337; *Eng. Flora*, v. *pt.* 2. *p.* 371.—On the under side of leaves of Anemone in gardens. Lobes at the mouth of the peridium not constantly four. April to May.

8. *Æcidium albescens*, Grev. (Moschatel Æcidium); leaf blistered, whitish, scattered; peridia white, split into a few large teeth; sporidia yellowish-white.—*Cooke, l. c. n.* 1414; *Grev. Fl. Ed. p.* 444; *Johnst. Fl. Berw. p.* 205; *Berk. Outl. p.* 337; *Eng. Flora*, v. *p.* 372. Æ.

Adoxæ, *Graves, Dub. Syn.* 908.—On leaves and petioles of *Adoxa moschatellina*. Not common. April.

9. *Æcidium Epilobii*, DC.; spots obliterated; peridia scattered, at length oval, wider above; sporidia orange, at length brown.—*Cooke, l. c. n.* 1415; *DC. Fl. Fr. p.* 238; *Gray's Nat. Arr. p.* 538; *Grev. Fl. Ed. p.* 444; *Johnst. Fl. Berw. p.* 204; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 372.—On the under side of leaves of *Epilobium montanum*, rarely on the upper. Common. June to August.

10. *Æcidium Soldanellæ*, Hornsch.; spots obliterated; peridia solitary, scattered over the inferior surface; sporidia orange.—*Berk. Outl. p.* 336; *Eng. Fl.* v. *pt.* 2. *p.* 369.—On the under surface of the leaves of *Soldanella alpina*.

11. *Æcidium Tragopogonis*, Pers. (Goatsbeard Æcidium); spots obliterated; peridia scattered, torn, wider above; sporidia orange, at length black.—*Cooke, l. c. n.* 1417; *Pers. Syn.* 211; *Sow. t.* 397. *f.* 2; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 370; Æ. Cichoracearum, *DC. Syn.* 50; *Gray's Nat. Arr. p.* 537; *Johnst. Fl. Berw. p.* 205.—On stems, leaves, and involucre of common Goatsbeard. Very common. May to June.

12. *Æcidium Euphorbiæ*, Pers. (Spurge Æcidium); spots obliterated, leaf thickened; peridia scattered and crowded, distinct; sporidia orange.—*Cooke, l. c. n.* 1418; *Pers. Gmel. Linn.* ii. *p.* 1473; *Syn. p.* 211; *Purt. Midl. Fl. n.* 1537; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 374; Æ. Characiæ, *Gray's Nat. Arr. p.* 537; Æ. Cyparissiæ, *Moug. et Nest. n.* 87.—On the under surface of the leaves of Spurge. Common. May to June.

Sect. II. *Peridia in tufts or clusters.*

a. *Elongatæ.*

13. *Æcidium Berberidis*, Pers.; spots roundish, bright red; subiculum thickened; peridia in subrotund or oval patches, often elongated; sporidia orange.—*Cooke, l. c. n.* 1419; *Pers. Syn. p.* 209; *Sow. t.* 397. *f.* 5; *Purt. Midl. Fl. n.* 1125; *Fl. Devon. pt.* ii. *p.* 4; *Grev. Sc. Cr. Fl. t.* 97; *Fl. Ed. p.* 446; *Berk. Outl. p.* 337; *Eng. Flora*, v. *pt.* 2. *p.* 371; Rœstelia Berberidis, *Gray's Nat. Arr. p.* 534; Lycoperdon poculiforme, *Jacq. Coll. t.* 4. *f.* 1.—On leaves, peduncles, and fruit of the common Berberry. Common. May to July.

14. *Æcidium Thalictri*, Grev. (Meadow Rue Æcidium); collected

in roundish clusters; peridia oblong; sporidia bright-orange.—*Cooke, l. c. n.* 1420; *Grev. Sc. Crypt. Fl. t.* 4; *Berk. Outl. p.* 337; *Eng. Flora*, v. *pt.* 2. *p.* 371.—On *Thalictrum alpinum.* Not uncommon in Scotland.

15. *Æcidium crassum*, Pers. (Buckthorn Æcidium); spots yellow-brown, subiculum thickened; peridia crowded into a roundish heap, at first globose, yellow, at length open; sporidia orange.—*Cooke, l. c. n.* 1421; *Pers. Syn. p.* 208; *Ic. et Descr. t.* 10. *f.* 1, 2; *Gray's Nat. Arr. p.* 535; *Berk. Outl. p.* 337; *Eng. Flora*, v. *pt.* 2. *p.* 373; Æ. Rhamni, *Purt. Midl. Fl.* iii. *n.* 1538.—On *Rhamnus catharticus* and *R. Frangula.* Common.

16. *Æcidium Periclymeni*, DC. (Honeysuckle Æcidium); spots variegated, yellow and brown, subiculum thickened; peridia sometimes elongated, in roundish or effused heaps; sporidia orange.—*Cooke, l. c. n.* 1422; *DC. Fl. Fr.* ii. *p.* 597; *Gray's Nat. Arr. p.* 537; *Grev. Fl. Ed. p.* 445; *Johnst. Fl. Berw. p.* 206; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 370.—On the under surface of honeysuckle leaves. Not common. June to August.

β. *Poculiformæ.*

17. *Æcidium Calthæ*, Grev. (Marsh Marigold Æcidium); aggregate; peridia somewhat campanulate, with numerous minute marginal teeth; sporidia bright-orange, subglobose or oval.—*Cooke, l. c. n.* 1423; *Grev. Fl. Ed. p.* 446; *Berk. Outl. p.* 387; *Eng. Fl.* v. *pt.* 2. *p.* 371.—On leaves and petioles of *Caltha palustris*, margin of peridia pale and brittle. Rare. Spring.

18. *Æcidium Ranunculacearum*, DC. (Crowfoot Æcidium); spots obliterated, subiculum thickened; peridia in irregular heaps, densely crowded together; sporidia orange.—*Cooke, l. c. n.* 1424; *DC. Fl. Fr.* vi. *p.* 97; *Grev. Fl. Ed.* 446; *Johnst. Fl. Berw. p.* 205; *Berk. Outl. p.* 337; *Eng. Flora*, v. *pt.* 2. *p.* 370. Æ. Ranunculi, *Sow. t.* 397. *f.* 2; *Gray's Nat. Arr. p.* 535. Æ. confertum, *Gray's Nat. Arr. p.* 535; *Grev. Fl. Ed.* 446; *Johnst. Fl. Berw. p.* 205. Æ. Ficariæ, *Purt. Midl. Fl. p.* 333. Æ. Clematidis, *Gray's Nat. Arr. p.* 535.—On leaves of various *Ranunculaceæ;* very common on *R. Ficaria*, not uncommon on *R. repens*, more rarely on *R. acris* and *R. bulbosus.* Spring.

19. *Æcidium Galii*, Pers. (Bedstraw Æcidium); spots linear or oblong, obscurely brown; peridia scattered, rarely aggregate, dentate,

whitish; sporidia white.—*Cooke, l. c. n.* 1425; *Pers. Syn. p.* 207; *Berk. Outl. p.* 337; *Ann. of Nat. Hist. n.* 490.—On the leaves of *Galium verum.*

20. *Æcidium Bunii*, DC. (Pig-nut Æcidium); spots obliterated, subiculum thickened; peridia in irregular subrotund or oval heaps; sporidia orange.—*Cooke, l. c. n.* 1426; *DC. Fl. Fr.* vi. *p.* 96; *Gray's Nat. Arr. p.* 535; *Grev. Fl. Ed. p.* 445; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 370.—On *Bunium bulbocastanum* and *Pimpinella saxifraga.* Spring.

21. *Æcidium Valerianacearum*, Dub.; hypogenous, rarely cauline, spots on a thickened subcircular or oblong base; peridia scattered, more or less crowded, cap-shaped, tawny, margin erect denticulate; sporidia dirty-yellow.—*Cooke, l. c. n.* 1427; *Dub. Syn. p.* 908; *Johnst. Fl. Berw. p.* 206; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 370.—On *Valeriana officinalis* and *V. dioica.* Not uncommon in the north.

22. *Æcidium Asperifolii*, Pers. (Borage Æcidium); clusters subrotund, on a slightly thickened subiculum; peridia scattered; sporidia yellowish-white.—*Cooke, l. c. n.* 1428; *Pers. Syn.* 209; *Gray's Nat. Arr. p.* 536; *Berk. Outl. p.* 337; *Ann. of Nat. Hist. n.* 255; Lycoperdon innatum, *With.* (in part).—On leaves of various *Borragineæ.* Summer. The parts of the leaves on which it occurs are rendered concave on one side, and convex on the other.

23. *Æcidium Grossulariæ*, DC. (Gooseberry Æcidium); spots yellow, bright red on the opposite side, with a yellow border; peridia crowded in roundish heaps, at length brown, and surrounded with a brown area; sporidia orange.—*Cooke, l. c. n.* 1429; *DC. Fl. Fr.* vi. *p.* 92; *Grev. Sc. Cr. Fl. t.* 62; *Fl. Ed. p.* 446; *Johnst. Fl. Berw. p.* 206; *Fl. Devon. pt.* ii. *p.* 4; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 372.—On leaves and fruit of Gooseberry, and leaves of Currant. Common. May to June.

24. *Æcidium Urticæ*, DC. (Nettle Æcidium); spots obliterated, subiculum thickened; peridia disposed in elongated or subrotund heaps, at first subglobose, then gaping; sporidia orange.—*Cooke, l. c. n.* 1430; *DC. Fl. Fr.* ii. *p.* 243; *Grev. Fl. Ed. p.* 445; *Gray's Nat. Arr. p.* 536; *Johnst. Fl. Berw. p.* 206; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 374; *Purt. Midl. Fl.* iii. *p.* 294.—On leaves and stems of Nettles, distorting them very much. Common. June.

25. *Æcidium Behenis*, DC. (Bladder Campion Æcidium); spots

yellow, brown on opposite side; peridia somewhat circinating, in subrotund heaps; sporidia brown.—*Cooke, l. c. n.* 1431; *DC. Fl. Fr.* vi. 94; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 472.—On *Silene inflata.* Not common. Some of the peridia are short and open, others larger and closed.

26. *Æcidium Orobi,* DC. (Bitter Vetch Æcidium); spots yellow, effused; peridia scattered and disposed in small heaps; sporidia at length white.—*Cooke, l. c. n.* 1432; *DC. Fl. Fr.* vi. *p.* 95; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 373.—On stems and leaves of *Orobus tuberosus.* Scotland.

γ. *Subimmersæ.*

27. *Æcidium Compositarum,* Mart. (Composite Æcidium); spots purplish, subrotund, confluent above; peridia crowded, in orbicular patches, or circinating on the under surface; sporidia orange, oval.—*Cooke, l. c. n.* 1433; *Mart. Erl. p.* 314; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 370.

Var. *a. Taraxaci,* Grev.; clusters small, scattered.—*Fl. Ed. p.* 444; *Johnst. Fl. Berw. p.* 205.—On leaves of the Dandelion. June to July.

Var. *b. Prenanthis,* Pers.; spots circular or irregular, purplish; subiculum incrassated.—*Pers. Syn. p.* 208; *Grev. Fl. Ed. p.* 445; *Johnst. Fl. Berw. p.* 206.—On leaves of Hawkweed (*Hieracium paludosum*). Summer.

Var. *c. Tussilaginis,* Pers.; clusters round on a thickened base; peridia circinating.—*Pers. Syn. p.* 209; *Sow. t.* 397. *f.* 1; *Grev. Fl. Ed. p.* 445; *Johnst. Fl. Berw.*; *Gray's Nat. Arr. p.* 537. Æ. Petasitidis, *Gray's Nat. Arr. p.* 536. Lycoperdon epiphyllum, *Linn. Sp. Pl.* 1655; *With.* iv. *p.* 456; *Hull's Brit. Fl. p.* 415.—On the under surface of leaves of Coltsfoot and Butterbur. Common. Autumn.

Var. *d. Jacobeæ,* Grev.; pustular, soon becoming agglomerated, numerous, depressed; peridia splitting into short, brittle, yellowish-white teeth.—*Grev. Fl. Ed. p.* 444; Æ. Senecionis, *Desm. n.* 677; Æ. Sonchi, *Johnst. Fl. Berw. p.* 206.—On leaves of *Senecio Jacobæa* and *Sonchus arvensis.* June to August.

Var. *e. Lapsani,* Purt.; spots purplish, irregular, confluent, on both sides of the leaves; peridia amphigenous in irregular patches or scattered, not prominent, teeth numerous, minute, reflexed; sporidia yellow, oval.—*Purt, mss.*—On both surfaces of the leaves of *Lapsana communis.* April. Not common. (Tab. XIV. f. 2.)

28. *Æcidium Saniculæ*, Carm. (Sanicle Æcidium); maculis purpurascentibus, subincrassatis, minutis, sparsis, subrotundatis; peridiis congestis, hypophyllis, semiorbicularis, demum expansis, margine late dentato; sporidiis luteolis, ellipticis.—*Cooke, l. c. n.* 1434.

Spots purplish, slightly incrassated, small, scattered, roundish; peridia in small circinate clusters, hypogenous, and on the petioles, at first hemispherical, at length open, margin with from 4 to 6 spreading lobes; sporidia yellowish, elliptical.—On the under surface of the leaves and on the petioles of *Sanicula Europæa*. Not uncommon. May and June. (Tab. XIV. f. 1.)

This is a very distinct and interesting plant, and I should judge from its frequency in the Kentish districts that it is not uncommon wherever the Sanicle abounds. The small size of the clusters, sometimes but little larger than those of a *Puccinia*, may in some measure account for its remaining so long unnoticed. A specimen is included in the Hookerian Herbarium from Carmichael's Appin collection, but I cannot find it described in any work to which I have referred.

29. *Æcidium Violæ*, Schum. (Violet Æcidium); spots yellowish; peridia in irregular heaps, seriate and scattered; sporidia orange, at length brown.—*Cooke, l. c. n.* 1435; *Grev. Fl. Ed. p.* 444; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 372. Æ. Violarum, *Gray's Nat. Arr. p.* 537; *Johnst. Fl. Berw. p.* 250.—On leaves, petioles, and sepals of Violets. Common. May and June.

30. *Æcidium Poterii*, n. sp. (Burnet Æcidium); maculis obliteratis; peridiis circinatis vel sparsis, immersis, margine denticulato deciduo; sporidiis luteolis, ovatis.—*Cooke, l. c. n.* 1436.

Spots obliterated, clusters subrotund or elongated; peridia hypogenous and on the petioles, circinating or scattered, immersed, margin irregularly fringed with numerous minute teeth, soon falling away; sporidia yellowish, oval.—On the under surface of the leaflets and on the petioles of *Poterium Sanguisorba*. Rare. May and June. Dartford Brent, Kent. (Tab. XIV. f. 3.)

This species is interesting from its association with a note in the Eng. Flora, vol. v. pt. 2. p. 373, to the following effect:—"An *Æcidium* apparently of some interest has been found by Dr. Greville on *Poterium Sanguisorba*; the specimens, however, in Dr. Hooker's Herbarium are too young to describe." It was in consequence of this note that I made diligent search for the *Æcidium* above described, and only found

a few specimens on the smallest and most attenuated radical leaves on a hedgebank at Dartford.

31. *Æcidium Geranii*, DC. (Cranesbill Æcidium); spots yellow and purple; peridia in circinating clusters; sporidia yellow, at length brown.—*Cooke, l. c. n.* 1437; *DC. Fl. Fr.* vi. *p.* 93; *Johnst. Fl. Berw. p.* 205; *Berk. Outl. p.* 337; *Eng. Fl.* v. *pt.* 2. *p.* 371.—On the under surface of leaves of *Geranium pratense.* Not common.

32. *Æcidium Menthæ*, DC. (Mint Æcidium); spots obliterated; subiculum thickened; peridia scattered, emersed, or aggregate immersed; sporidia orange, elliptic.—*Cooke, l. c. n.* 1438; *DC. Fr. Fl.* vi. *p.* 95; *Berk. Outl. p.* 336; *Eng. Fl.* v. *pt.* 2. *p.* 369.—On various Mints. Common.

33. *Æcidium scrophulariæ*, DC. (Figwort Æcidium); spots yellowish; peridia in roundish circinate clusters (rarely scattered) on the under surface; spores whitish, becoming tawny.—*DC. Fl. Fr.* vi. *p.* 91. Cæoma scrofulariatum, *Lk. Sp. n.* 131. Collected at Thame and Sydenham, Oxon., on the leaves of *Scrophularia aquatica* by Dr. Ayres, and included by him in his published Fungi Exsic. n. 21. It would stand next to *Æ. menthæ*, DC., as n. 1438*, in the 'Index Fungorum Britannicorum.' Unfortunately I had not seen Dr. Ayres's 'Fungi' when the Index went to press, hence this species was omitted. I know of no reason for its exclusion from Berkeley's 'Outlines of British Fungology.'

34. *Æcidium pedicularis*, Lobosch; spots obliterated, subiculum thickened; peridia thickly and irregularly clustered, subimmersed; sporidia dirty, pallid orange.—*Cooke, l. c. n.* 1439; *Lob. in Act. Mosc.* v. 76. *t.* v. *f.* 1; *Berk. Outl. p.* 336. Cæoma pedicullariatum, *Lk. Sp.* ii. 47. Cæoma pedicularis, *Schlecht, Fl. Berol.* ii. 113.—On petioles, leaves, and stems of *Pedicularis palustris.* Not common.

35. *Æcidium Primulæ*, DC. (Primrose Æcidium); spots obliterated; peridia solitary, scattered, and crowded, hypogenous; sporidia whitish-yellow.—*Cooke, l. c. n.* 1440; *DC. Fl. Fr.* vi. *p.* 90; *Berk. Outl. p.* 336; *Eng. Fl.* v. *pt.* 2. *p.* 369.—On the under surface of leaves of Primroses. Not common. May.

36. *Æcidium rubellum*, Pers. (Dock Æcidium); spots purple; peridia circinating, centre free; sporidia yellowish-white.—*Cooke, l. c. n.* 1441; *Pers. in Gmel. Linn. p.* 1473; *Gray's Nat. Arr. p.* 536; *Grev. Fl. Ed. p.* 447; *Berk. Outl. p.* 336; *Eng. Fl.* v. *pt.* 2. *p.* 369. Æ. Rumicis, *Pers. Syn.* 207; *Sow. t.* 405; *Purt. Midl. Fl.* iii. *t.* 26.

—On leaves of Dock and Sorrel. Not uncommon in moist localities. May and June.

37. *Æcidium Ari*, Berk. (Wake-robin Æcidium); spots round, confluent; peridia circinating, not crowded, central ones abortive.—*Cooke, l. c. n.* 1442; *Berk. Outl. p.* 336; *Eng. Fl.* v. *p.* 2. *p.* 369.—On leaves of *Arum maculatum*. Not common.

38. *Æcidium Dracontii*, Schwein. (Arum Æcidium); spots pallid, extensively scattered over the leaves, sometimes nearly covering them; peridia large, scattered, abundant, disposed without order on the spots; spores orange.—*Cooke, l. c. n.* 1443; *Schweinitz, in Trans. Am. Philos. Soc.* 1834.—On *Arum triphyllum*, in gardens. Melbury, 1863 (Rev. M. J. B.). A North American species now recorded for the first time as appearing in this country.

39. *Æcidium Allii*, Grev.; spots pale; peridia circinating, not contiguous; sporidia yellowish.—*Cooke, l. c. n.* 1444; *Grev. Fl. Ed. p.* 447; *Berk. Outl. p.* 336; *Eng. Fl.* v. *pt.* 2. *p.* 369; *Johnst. Fl. Berw. p.* 207. Æ. Allii-ursini, *Pers. Syn. p.* 210.—On leaves of broad-leaved Garlic (*Allium ursinum*). Not common. June and July.

Endophyllum, *Lév.*

Peridium enclosed within the substance of the leaf, bursting irregularly.

40. *Endophyllum Sempervivi*, Lév.; peridia immersed, elliptic or roundish; sporidia ochraceous, becoming brownish.—*Cooke, l. c. n.* 1445; *Berk. Outl. p.* 337. Uredo Sempervivi, *Alb. et Schw. n.* 356; *Berk. in Ann. Nat. Hist. n.* 476.—On leaves of Houseleek.

Explanation of Plate XIV.

Fig. 1. *Æcidium Saniculæ*, (*b*) cluster of peridia, (*c*) peridium further magnified. Fig. 2. *Æcidium Compositarum*, var. *Lapsani*, (*b*) arrangement of peridia, (*c*) peridia enlarged. Fig. 3. *Æcidium Poterii*, (*b*) peridia magnified.

ANALYSIS OF CHINCHONA BARK AND LEAVES GROWN ON THE NEILGHERRY HILLS, AND RECEIVED IN ENGLAND NOVEMBER 20th, 1863.

Communicated by Clements R. Markham, Esq.

The bark and leaves forwarded by Mr. M'Ivor were removed from the plants during the rains, or the season of the year when the sap is

in full flow, being the period when the plants contain the greatest proportion of moisture.

The object in submitting these specimens was to ascertain how far this condition affects the yield of alkaloids. The last supply of bark submitted to analysis by Mr. Howard was cut when the sap was beginning to rise. A further supply will be forwarded in the dry season, when the plants are at rest, and this will be sufficient to enable Mr. Howard to form an opinion of the most advantageous time of collecting the bark. Mr. M'Ivor is inclined to think that the bark should either be cut in the middle of the dry season or in the spring, as the sap is beginning to rise; these seasons are also most favourable for drying and preserving the bark.

The plants under cultivation have given unmistakable signs that they do not require so moist a climate as they are represented to enjoy on the Andes. This season at Neddivuttum has been unusually wet, and several of the Grey Bark plants have suffered in consequence. The way in which the continuous rain seems to affect the plants is by throwing a constant stream of water down the channels of the leaves, which, resting in the axil, causes the bark there to decay; this decay is communicated to the young growing wood, and, ultimately, to the pith; the decay having once reached the pith, the rain-water finds its way into the centre of the stem, and in this way affects the health of the plant. A specimen of the wood of *Chinchona micrantha* was forwarded for Mr. Howard's opinion on the subject. The Red Bark, Crown Barks, and Yellow Bark, do not suffer from this cause, apparently because the petiole of the leaf in these species is more rounded, and, consequently, it does not conduct and deposit the water in the axil of the leaf, as is the case with the Grey Barks.

Specimens of Chinchona Barks, etc.

No. 1. *Chinchona succirubra*, Red Bark from plants of twenty-two months' growth.

2. *C. succirubra*, Red Bark from plants of eighteen months' growth, thickened by being covered with moss for three months.
3. *C. succirubra*, Red Bark from branches of eighteen months' growth and under.
4. Renewed bark of *C. succirubra*, the centre part being the bark renewed a second time.

5. Red Bark from small branches broken by the wind.
6. *C. micrantha*, bark from a plant of eighteen months' growth.
7. *C. micrantha*, bark from upper part of plant of eighteen months' growth injured by the rains.
8. *C. micrantha*, bark from branches broken by the wind.
9. *C. Pahudiana*, grown in open ground.
10. Green leaves of Red Bark dried in the shade.
11. Green leaves of *C. officinalis* dried in the shade.
12. Green leaves of *C. micrantha* dried in the shade.
13. Specimen of wood of *C. succirubra*, showing the injury done by the continued rains.

Report to the Under Secretary of State for India, on the Bark and Leaves sent home in October, 1863, *for Examination, by J. E. Howard, Esq., F.L.S.*

The box of specimens reached me in good condition, and has furnished valuable materials for further research, although the quantity of bark sent this time amounted to but a few ounces in weight. Several pounds' weight of leaves (well dried and with a marked tea-like fragrance) have allowed me the opportunity of following various lines of experiment in order to ascertain their probable commercial value. I regret to be obliged to confirm the opinion I expressed in my last, that the leaves will not supply material for the extraction of Quinine, although the quantity of the first rough precipitate from an acid solution, having the appearance of a hydrated alkaloid, is considerably more than I succeeded in obtaining before, being equal to 1·31 per cent. of the weight of the leaves. Of this a small portion was soluble in ether, to the extent of 0·17 per cent., forming a clear yellow solution, which precipitates on the addition of a solution of oxalic acid in spirit of wine. Nevertheless, the further prosecution of the inquiry and the attempt to purify the alkaloid showed me clearly that I had to do with a state of things very different from that which exists in the bark, and that I should not succeed in obtaining an available salt of Quinine. I hope to be able to prosecute this research on a still larger quantity of the material, in order to test the conclusions to which my present investigation tends. The alkaloid exists in the leaves in very intimate relationship with the green colouring-matter. This latter substance is well deserving of a more elaborate investigation, as it seems

to be somewhat analogous to indigo, and its ethereal solution has a peculiar effect on the rays of light, the reflected ray having almost a blood-red colour, whilst the transmitted ray is a fine green.*

I will now notice the remaining specimens. Nos. 1 and 2, though presenting a promising appearance, were in too small quantity to justify examination. No. 3, "Red Bark from branches of eighteen months and under," yielded me not less than 6 per cent. of rough alkaloid; but of this a larger proportion seemed to be Quinidine and Chinchonidine, but as I had little more than an ounce of bark to examine, I cannot consider this comparative result as an ascertained fact. As these barks were cut at the period when the sap is in full flow, it is not at all improbable that the alkaloids may vary somewhat from those produced at a different season. The above 6 per cent. of alkaloid yielded in a state of further purification 4·10 per cent. of Quinidine, Chinchonidine, and Quinine, and also a portion, 0·9 per cent., insoluble in ether, in all 5 per cent. The portion insoluble in ether, and not capable of being crystallized from spirit, I set down as Chinchonicine, and not pure Chinchonine, of which last I find but few indications in these young barks. The Quinidine crystallizes as hydriodate, and the Chinchonidine as a resinous mass, when united with hydriodic acid. Both form a feathery crystallization as sulphates.

No. 5, "Red Bark from small branches broken by the wind," gave a result very nearly resembling the analysis of the leaves. This is not surprising, considering the very immature state of these succulent branches. I obtained 1 per cent. of alkaloid soluble in ether, which gave a doubtful trace of crystallization as sulphate. A further portion of impure alkaloid insoluble in ether resembled the same substance as described under No. 3.

The No. 8, "*C. micrantha* bark, from small branches broken by the wind," gave, on examination, more chincho-tannic acid than No. 5. The precipitated alkaloids appeared to be, as above, 1 per cent., but of this 0·40 per cent. proved to be oxidized tannin, and insoluble in ether; the rest in part crystallized from ether, and in part formed a Quinine-like mass; the crystalline portion formed crystals as hydriodate, indicating the Quinidine of Pasteur: the total proved to be Quinidine (Quinine?), and a trace of Chinchonine 0·60 per cent.

* Further investigation has enabled me to separate this peculiar green solution into two entirely different substances.—*J. E. H.*

No. 9, *C. Pahudiana*, contained more chincho-tannic acid than even the last. The precipitate of alkaloid was minute, and much implicated with astringent colouring-matter. Ether dissolved a small portion, in which, on evaporation, crystals could be perceived. This bark, in the state in which sent, has scarcely any bitter taste, and would be worthless in commerce. I cannot say what the mature bark might be after some years' growth, but doubt whether it can ever repay the expense of cultivation. I may remark that this bark a good deal resembles that of *C. purpurea* in its external appearance; and also that the bark of *C. micrantha* now sent has much the same character as that which characterizes the bark of the same Chinchona as grown in South America.

I find similar characteristic colouring in the leaves of the three species sent, *C. officinalis*, *micrantha*, and *succirubra*. The same also seems (a little altered) to pervade the specimen of wood, marking a difference from the heartwood of *C. succirubra* of many years' growth which I have before examined.

HYPERICUM UNDULATUM, *Schousb.*, A RECENT ADDITION TO THE BRITISH FLORA.

By T. R. Archer Briggs, Esq.

A short time ago I sent specimens of an *Hypericum*, collected in the neighbourhood of Plymouth, to Mr. J. G. Baker, and have been informed by him that the plant is entirely new to our flora. He has drawn up a description of it, which he has kindly given me permission to use.

"Rootstock creeping widely. Stems erect, 2 to 3 feet high, slender, with four slightly-winged angles. Leaves oblong or obovate-amplexicaul, thickly studded with pellucid dots and with a network of pellucid veins. Panicle loosely corymbose, the long lateral branches with often only two or three flowers. Sepals always erect, lanceolate, acute or bluntish, with pellucid veins and dots, sometimes, but not always, with black dots on the back and along the edges. Petals elliptical or obovate, as large as those of *H. perforatum*, tinged with red on the out-

side, slightly dotted with black on the edges. Styles about as long as the ovary in the fully expanded flowers, half as long as the capsules.

"Differs from *H. perforatum* by its quadrangular stem, broader leaves with network of pellucid veins, broader and blunter sepals, and styles only half as long as capsule; from *H. dubium* by its closely dotted leaves and erect sepals; from *H. quadrangulum* by its less robust and less decidedly winged stem, more dotted leaves, larger petals, and differently shaped sepals; from all three by the much fewer and more distantly placed flowers of its panicle."

I first collected the plant on the 7th of August, 1861; it grows plentifully by a stream (a small tributary of the Plym, on the right bank), and in boggy ground at Common Wood, about four or five miles from Plymouth, Devon; and occurs less abundantly by a stream in a meadow at Fursdon, Egg Buckland, about a mile from Common Wood, and in the same county. I noticed the following plants growing with it:—*Hypericum Elodes*, *Epilobium palustre*, *Hydrocotyle vulgaris*, *Wahlenbergia hederacea*, *Sibthorpia Europæa*, *Anagallis tenella*, *Juncus acutiflorus*, *Narthecium ossifragum*, and *Osmunda regalis*.

I have since been informed, by Professor Babington, that this *Hypericum* is a species widely distributed over Southern Europe, Northern Africa, Madeira, and the Azores, the *H. undulatum*, Schousb., *H. decipiens*, Watson, *H. Neapolitanum*, Tenore, and probably also the *H. Bæticum*, Boiss. Elench. 40; Voyage, n. 332, t. 34,—*H. undulatum* being the oldest name. M. Boissier gives the following diagnosis of *H. Bæticum*:—"Caule erecto, 2–3-pedali, quadrangulo, angulis subalatis; foliis ovali-lanceolatis, obtusis, subamplexicaulibus, subtus evidenter 5–6-nerviis, glabris, densissime pellucido-punctatis, margine nigro-punctatis, panicula elongata, laxa, bracteis linearibus, sepalis ovato-lanceolatis acutis obtuse crenatis, margine nigro-punctatis, capsula matura subduplo brevioribus; petalis et antheris nigro-punctatis."

I should add that Dr. Seemann has just received a letter from Professor Alexander Braun, embodying the result of a comparison of one of my specimens with those of *H. undulatum*, in the Berlin herbarium. An abstract of this letter, together with a coloured plate, and critical remarks on the synonyms and geographical distribution of the plant, will be found in an article by Professor Babington, now preparing for one of the forthcoming numbers of the 'Journal of Botany.'

10, *Torrington Place, Plymouth.*

THE CUCURBITACEÆ OF TROPICAL POLYNESIA.

By Berthold Seemann, Ph.D., F.L.S.

The *Cucurbitaceæ* of tropical Polynesia are involved in considerable confusion, owing to Forster having admitted into his 'Prodromus,' several species named by Solander, but of which no description has been published. The authentic specimens and manuscript descriptions of Solander, together with Sidney Parkinson's drawings, all preserved at the British Museum, have enabled me to clear up the synonymy of these plants. To set this matter finally at rest, it will be advisable to enumerate all the *Cucurbitaceæ* hitherto found in the region alluded to, including the species generally cultivated.

1. *Melothria Samoensis*, A. Gray, Bot. Wilkes, p. 641.—Samoan Islands (*United States Expl. Exped.*).

2. *Zehneria Baueriana*, Endl. Fl. Norf. n. 126.—Norfolk Island (*Bauer, fide Endl.*).

3. *Karivia Samoensis*, A. Gray, Bot. Wilkes, p. 643.—Cucumis Maderaspatanus ?, *Sol. Prim. Fl. Insul. Pacif. p.* 337, *ined.*; *Parkinson's Drawings of Tahitian Plants, t.* 111, *ined.*—Samoan Islands (*United States Expl. Exped.*), Society Islands (*Banks and Solander !, in Brit. Mus.*).—Nomen vernaculum Tahitense, teste Pritchard, "Tavivi" (*i.e.* twiner); teste Solander, "Tahwihwi, vel Tawhiwhi;" Raiatense, teste Solander, "Hoohove" v. "Huhue."

I take A. Gray's *Karivia Samoensis*, from the Samoan group, to be the same plant which Banks and Solander gathered in the Society Islands, which Solander in his unpublished Prim. Fl. Insul. Pacif. describes as "*Cucumis Maderaspatanus ?*," and for which he quotes Parkinson's drawings, t. 111, with his own manuscript name attached. Solander describes the female flowers as growing in the same axils as the male, and on isolated, thin, and 1-florous peduncles. The fruit he has not seen, nor do his specimens exhibit any trace of either female flowers or fruit. The male flowers are racemose, the pedicels being arranged in whorls, which, when the racemes are just beginning to blossom, gives them the appearance of small umbels or cymes, as stated by A. Gray. The racemes are either simple or furcate, 4–5 inches long; the corolla cream-coloured. The upper surface of the leaves is generally covered with minute white dots, which are not noticed by A. Gray, nor

indicated by the accurate Parkinson, probably they are not so prominent in fresh specimens; even in some of the leaves before me they are scarcely preceptible. Solander says of them, "glandulis minutis distinctis, in siccis parum incrustatis." Otherwise Banks and Solander's specimens, and the latter's description agree well with A. Gray's account of the plant. When the female flowers and fruit are better known, it will probably turn out that the species under consideration is not a true *Karivia*. *Bryonia?*, sp. nov.?, no. 290 of Guillemin's list, Tahiti (Bert. et Mœrenh.), and *Bryonia Johnstoni*, Cuzent, O'Taiti, p. 232 (name only), are doubtless identical with the plant.

4. *Citrullus vulgaris*, Schrad. in Eckl. et Zeyh. Enum. p. 279.—Cucurbita Citrullus, *Linn. Spec.* 1435.—Cultivated in the Sandwich (*Seemann !*), Vitian (*Seemann !*), and Society Islands (*Cuzent*), but known to be introduced by Europeans.

5. *Momordica Charantia*, Linn. Spec. 1433.—Viti (*Williams !*). Tahiti (*Banks and Solander !, United States Expl. Exped.*), supposed to be a recent introduction, by A. Gray, who did not know of its being contained in the older collections.

6. *Luffa insularum*, A. Gray, Bot. Wilkes, p. 644.—Cucurbita multiflora, *Sol. ms. in Forst. Prodr. n.* 556, *et in Parkinson's Drawings of Tahitian Plants, t.* 108 (a branch with *yellow* male flowers); *Soland. Prim. Fl. Ins. Pacif.* p. 335; *Sprengel, Syst.* v. *p.* 45; *De Cand. Prodr.* iii. *p.* 318. Nomen vernaculum Tahitense, "Ehuerharho?," teste Sol., "Huararoro," teste Cuzent.—Tahiti (*Banks and Solander !, Forster! in Mus. Brit,*), Tongan Islands (*Barclay ! n.* 3405, *in Mus. Brit.*), Vitian Islands (*Seemann ! n.* 193).

A *Cucurbitacea* mentioned by Collie under the native name of "Arroro," and thought by Hooker and Arnott to be *Cucurbita Aurantia*, is probably this species, the name being simply incorrectly spelt, whilst the statement that the fruit was employed for holding scented cocoanut oil is quite correct, though throughout Polynesia the Bottle-gourd (*Lagenaria vulgaris*) has, from time immemorial, been more generally applied for that purpose, the fruit of *Luffa* being not so well suited for conversion into vessels intended for holding fluids.

7. *Lagenaria vulgaris*, Ser. in De Cand. Prodr. iii. p. 299.—Cucurbita Lagenaria, *Linn. Spec.* 1434; *Forst. Prodr. n.* 362. Cucurbita bicirrha, *Forst. ms. in Guill. Zeph. Tait. n.* 285. Nomen vernaculum Tahitense, "E'Hooe" (= E'Hue), teste Solander, "Hue," teste W.

Pritchard; Vitiense, "Vago," teste Seemann.—Tahiti (*Banks and Solander! in Mus. Brit.* . Viti (*Seemann! n.* 495), Java (*Horsfield! in Mus. Brit.*), Easter Island (*Forster!*), Sandwich Islands (*Seemann!*).

The Bottle-gourd is one of the *Cucurbitaceæ*, found cultivated in the different Polynesian Islands, where they were first discovered by Europeans.

8. *Cucumis acidus*, Jacq. Obser. Bot. pars iv. p. 14 (1764).—Cucumis pubescens, *Willd. Spec.* iv. *p.* 614 (1805); *De Cand. Prodr.* iii. *p.* 301; *Wight, Icon. t.* 496. Cucumis Maderaspatanus, *Roxb. Fl. Ind.* iii. *p.* 723, *non alior.* Cucurbita aspera, *Sol. ms. in Forst. Prodr. n.* 555 (1786), *et in Parkinson's Drawings of Tahitian Plants, ined. t.* 110; *Sol. Prim. Fl. Ins. Pacif. p.* 336. Nomen vernaculum Tahitense, "E-atu" vel "Ea-ea," teste Solander; Vitiense, "Timo."—Tahiti (*Banks and Solander! in Mus. Brit.*), Viti (*Seemann! n.* 194), Java (*Horsfield! in Mus. Brit.*), East Indies (*Roxburgh! in Mus. Brit.*), Ceylon (*Thwaites! in Mus. Brit.*), Cape de Verd Islands (*fide A. Gray*), Kuka, Central Africa (*Edward Vogel! n.* 59, *in Mus. Brit.*).

An authentic specimen of *Cucumis acidus*, in the British Museum, with Jacquin's manuscript note:—"Nova certe species, nata in Horto Bot. Vind. anno 1762 e seminibus Indicis sine nomine a Gronovio acceptis. Fructus interne ubi *Cucumis*, sed acidissimus, figura obovata glabra," has enabled me to identify *C. acidus* and *C. pubescens*, and to vindicate the priority of the former name, a name evidently overlooked by all writers on *Cucurbitaceæ*. A. Gray has attempted to establish two varieties of this species, distinguished by the shape and the glabrous or pubescent state of the surface of the fruit, but the characters assigned do not seem to hold good. Parkinson's figure of the fruit exactly corresponds with the shape assigned to it by Jacquin, but it is pubescent. In Wight's plate one of the fruits is ovate, the other almost elliptical. The tendrils are always simple. Forster's *Cucumis bicirrha* which A. Gray hesitatingly refers to this plant, is identical with *Lagenaria vulgaris*, in the young specimens of which the tendrils are often dichotomous.

9. *Cucumis sativus*, Linn. Spec. 1437.—Cultivated in the Sandwich (*Seemann!*), Society (*Cuzent, Lay, and Collie*), and Vitian Islands (*Seemann!*), but introduced by Europeans.

10. *Cucumis Melo*, Linn. Spec. 1436.—Cultivated in the Society

(*Cuzent*), Sandwich (*Seemann !*), and Vitian Islands (*Seemann !*), but introduced by Europeans.

11. *Cucurbita maxima*, Duch. in Lam. Dict. ii. p. 151; De Cand. Prodr. iii. p. 316.—Cultivated in the Sandwich Islands (*Seemann !*), from time immemorial.

The shells of this gourd are converted, by the Sandwich Islanders, into vessels (ipu), out of which they eat their "poi," *i.e.* fermented corms of *Colocasia antiquorum*, var. *esculenta*, as stated in my Narrative of the Voy. of H.M.S. Herald, ii. p. 86.

12. *Cucurbita Pepo*, Linn. Spec. 1435.—Cultivated in Tahiti, where, according to Solander, it was introduced by Captain Wallis in 1767; also grown in Viti (*Seemann !*), where it is of recent introduction.

13. *Cucurbita pruriens*, Sol. ms. in Forst. Prodr. n. 554, sine descrip. et in Parkinson's Drawings of Tahitian Plants, t. 109. Pilis rigidiusculis pruritum momentaneum excitentibus hispida, caule angulato, foliis profunde cordatis sublobato-5-angulatis sinuato-dentatis, cirrhis 2-fidis, pedunculis axillaribus solitariis, calycis laciniis oblongo-lanceolatis reflexis, fructibus globosis, junioribus farinosis pilosis.—Society Islands (*Banks and Solander ! in Mus. Brit.*).

"Annua. *Caules* longissimi, angulati, hispidi. *Folia* alterna, petiolata, magna, latiora (sæpe spithamam lata) quam longiora, profunde cordata, sinubus latis subrotundatis sublobato-angulata, angulis acutis, denticulata, denticulis minutis teretiusculis, molliuscula, pilosa, pilis supra longioribus adspersis, 5-nervia, venosa. *Glandulæ* nullæ. *Petioli* plerumque foliis longiores, hispidissimi. *Cirrhi* 2-fidi, longi, inferne hispidi. *Pedunculi* axillares, 1-flori, hispidissimi, *masculi* plerumque petiolis longiores, *feminei* ex eadem axilla, breves unciales, raro sesquiunciales. *Flores* magni, lutei. *Calyx* hirsutus, laciniis oblongo-lanceolatis, semiuncialibus, reflexis. *Filamenta* 3. *Antheræ* valde contortuplicata. *Germen* oblongum, hirsutissimum. *Pomum* globosum, cortice duro sublignoso tectum, farina alba facile detergenda dense irroratum, pilisque rigidiusculis pallidis sesquilinearibus undique adspersum, diametro 2- vel raro 3-unciali, dum penitus maturum Pomum læve, evadit absque farina pilisve. *Semina* magnitudine seminum *Cucumis sativæ*, sed margine tumido cincta. *Pili* in tota planta pellucidi, rigidiusculi, quasi articulati, subulati, pruritum momentaneum excitantes.—Hab. In Tahiti, Huahine, etc."—*Sol. Prim. Fl. Ins. Pacif. p.* 336, *ined.*

This plant is allied to *C. ovifera*, but perfectly distinct, the calyx being very different in the two species.

14. *Sycios australis*, Endl. Fl. Norfolk, p. 67 (1833).—S. Fretensis, *Hook. fil. in Lond. Journ. Bot.* vi. *p.* 473 (1847); *Walp. Ann.* i. 317. S. angulata, *Forst. Prodr. n.* 363 (*non Linn.*); *Hook. fil. Fl. N. Zealand*, i. *p.* 72, *ex parte*.—Norfolk Island (Bauer), New Zealand (*Banks and Solander! in Mus. Brit.*), New South Wales (*fide A. Gray*).

Forster and Hooker fil. have regarded this species as identical with *S. angulatus* of America, but the two seem to be quite distinct. A. Gray (Bot. Wilkes, p. 648) has already pointed out that the flower and fruit of *S. australis* are not larger than those of *S. parviflorus*, and less than half the size of those of *S. angulatus*. There are besides other distinctions. *S. angulatus*, Linn., is covered with long, floccose, often glandulose hair on the peduncles and fruit, its tendrils are 4- or more generally 5-fid, and its fruit sparingly covered with spines, whilst *S. australis* is without the long floccose hair, has always 3-fid tendrils, and its fruit is densely covered with spines. Besides, the form of the leaf is different in the two.

15. *Sycios pachycarpus*, Hook. and Arn. Bot. Beech. p. 83; A. Gray, Bot. Wilkes, p. 650, t. 80.—Oahu (*Macrae!*, *Lay and Collie*, *Gaudichaud*), Maui, Sandwich Islands (*United States Expl. Exped.*).

16. *Sycios macrophyllus*, A. Gray, Bot. Wilkes, p. 651, t. 81.—Hawaii, Sandwich Islands (*United States Expl. Exped.*).

17. *Sycios cucumerinus*, A. Gray, Bot. Wilkes, p. 652, t. 82.—Hawaii, Sandwich Islands (*Macrae!*, *United States Expl. Exped.*).

18. I have specimens of a *Cucurbitacea*, collected by Mr. Williams in Viti, but they are without flowers. Leaves 5-lobed, glabrous, lobes pinnatifid or dentated, tendrils simple. At the base the leaves form an acute angle, otherwise they look like some forms of *Momordica Charantia*.

Guillemin (Zeph. Tait.) mentions another *Cucurbitacea*, of which only a single branch was collected by Bertero and Mœrenhout, and which he refers with a mark of doubt to *Trichosanthes*. It is said to be called "Patara" by the natives, and is stated to have palmate leaves with seven, large, lanceolate leaflets; the flowers are unknown. Ellis (Polynesian Researches, vol. i. p. 360) says:—"*Patara* is a root growing wild in the valleys [of Tahiti], in shape and taste resembling a

potato, more than any other root found in Tahiti. It is highly farinaceous, though less nutritive than the Yam; the stem resembles the Woodbine or Convolvulus. The natives say the flower is small and white; I never saw one, for it is not cultivated, and but seldom sought, as the tuberous root is small, and more than two are seldom found attached to the same vine or stalk." The *Patara* will probably prove to be no *Cucurbitacea* at all, but *Dioscorea pentaphylla*, Linn., which I find mentioned in Cuzent's list under the native name of "Paauara;" but *Patara* is probably the correct name. The "Paauara" proper of Tahiti is, from all I can learn, identical with *Dioscorea aculeata*.

FOUR NEW SPECIES OF *AROIDEÆ*.

By H. Schott, Ph.D.

Dieffenbachia conspurcata, Schott, n. sp.—Petiolus 8–12 pollices longus, parum l. valde-crassus, ad l. ultra medium vaginatus, dorso pallidus, maculis parvis albis dense irregulariter guttato-irroratus. Lamina fol. exacte oblongo-elliptica, basi obtusata, rotundata vel subcordata, apice abrupte angustata, cuspide modica triangulari-acuminata aucta, supra, præcipue juxta vel in costæ vicina disci parte maculis irregularibus albis et pallide-viridibus crebris conspersa, ceterum subopaca vel nitidula tantum, venis exortu apertissimæ patentibus, marginem versus arcuatim sursum curvis utrinque 11–13. Longitudo laminæ 13–15-pollicaris, latitudo 6-pollicaris.—Pará, Brasiliæ.

Observatio: Dieffenbachiæ a celeb. Lemaire et Verschaffelt divulgatæ, denominationibus hucusque incognitis exornatæ, notis nominibus uti videtur sunt adpellandæ. Sic Dieffenb. grandis, *Lem. et Versch.*, est D. cognata, *Schott;* Dieffenb. Verschaffeltii, *Lem.*, est D. irrorata, *Martius*, et Dieffenb. Baraquini *illorum* est D. humilis, *Pœpp.*

Rhodospatha Wendlandii, Schott, n. sp.—Petioli pedales et ultra, in geniculum usque vaginati. Lamina fol. elliptica, 14–18 pollices longa, 6–7 pollices medio lata, basi rotundata, apice quoque rotundata, cuspidulo brevi, vix tres lineas prominente aucta, venis plurimis aperte-patentibus, parum marginem versus curvis. Pedunculus dimidium petiolum fulcientem circiter metiens, vagina illius maxima

parte obvolutus. Spatha 7–8 pollices longa, extus pallido flavo-virens, intus luteola, ovato-lanceolata, basi antice decurrens et quasi spadicis dorsum versus auriculata, ibique infima auriculata parte relicta, disrumpens, decidentis partis infima portione late-conchiformi, altera subconvoluta sensimque longe-angustata longiore terminata. Spadix cum stipite $\frac{3}{4}$-pollicari, 4-pollicaris, primum in spathæ parte conchiformi absconditus, digitiformis excepto stipite pallide-virente lutescens. Ovaria ad latera apicis subaurantiaca, inferne pallida. Filamenta flavicantia. Pollen farciminulose propullulans. Stigmata flava.—America centralis (*Wendland !*).

Rhodospatha blanda, Schott, n. sp.—Petioli pedales et ultra, vagina ad geniculum usque producta. Lamina fol. lanceolato-oblonga 14–18 poll. longa, 5–6 poll. medio lata, basi linea extrorsum arcuata subsensim cuneata, apice a medio sensim angustata, cuspidato-acuminata, venis plurimis patentibus, in margine parum curvis. Pedunculus 8–9 pollices longus, vagina 4-pollicari obvolutus. Spatha 5 pollices circiter longæ, $3\frac{1}{2}$ pollices latæ, extus flavo-virens, intus sulfureo-albida, basi parum vel vix decurrens, infima reflexa parte ex rotundato profunde conchiformi, subconvoluto apice sesquipollicari abrupte distincto terminata. Spadix cum stipite viridi fere pollicari, $3\frac{1}{2}$ pollices longus, $\frac{1}{2}$ pollicem crassus, digitiformis, pallide rubiginoso-carneus. Ovaria apice ad latera ochracea, stigmate pallido. Filamenta albida. Antheræ flavæ.—Brasilia, Ilheos (*Archidux F. Maximilianus !*).

Monstera egregia, Schott, n. sp.—Petioli 12 poll. et ultra longi, inferne canaliculate-vaginati, superne vagina expansa in geniculum usque alati. Geniculum $\frac{5}{4}$ poll. longum in laminam progrediens, laminæ portione plica sejuncta, cuneatim, margine crispato decurrente instructum, antice subcanaliculatum. Lamina fol. lanceolato-oblonga, 23–24 poll. longa, 9–10 poll. inferne lata, oblique-inæquilatera, supra atro-viridis, infra leviter flavo-viridis, apicem versus sensim angustata, acuminata, basi rotundata, foraminibus majusculis minimisque costæ approximatis prædita. Costa supra canaliculata, subtus semiteretiprominens. Venæ 27–29 utrinque, crassæ, approximatæ, rectiusculæ, patentes. Pedunculus e vagina petiolari parum procedens, brevis, crassus. Spatha 8 pollices longa, $3\frac{1}{2}$ pollices diametro profunda, basi latere exteriore late-rotundata, apice obtusa, cuspidulo brevi apiculata, utrinque flava. Spadix sessilis, $5\frac{1}{2}$ pollices longus, $\frac{5}{4}$ poll. crassus, spatha poll. 2 brevior. Ovaria apice et vertice flava. Stigma auran-

tiacum. Filamenta albida. Anthera pallide-flaventes.—Mexico (v. v. cult.!).

January 20, 1864.

NOTE ON THE KILKEE FUCUS.

Though the differences pointed out in our account of this *Fucus*, seemed to be greater than could pertain to a variety of *F. distichus*, L., yet we dared not venture to set aside the opinion of Harvey and Greville, who both had referred the Kilkee plant to this species. We have since examined the type specimens of *F. distichus* in the Linnean Herbarium, which agree admirably with Dawson Turner's accurate figure. Dr. Harvey has also received specimens from Agardh. He had, as he writes in October last (*vide* Report of Edin. Bot. Soc.), "no authentic specimens of the Arctic plant, nor have I seen one, but the specimens exactly agree with the descriptions of authors." The authentic specimens from the younger Agardh have shown him that his plant is a distinct and hitherto undescribed species, to which he proposes, in a letter to myself, to give the name FUCUS ANCEPS, Harv. and Ward. Having purposely described only the Irish specimens and not mixed up the characters of *F. distichus*, L., with those of the Kilkee plant, the diagnosis given in the December number of this Journal (p. 353) is only applicable to *F. anceps*, Harv. and Ward. The synonyms, and notice of the geographical distribution, must be deleted. We add, from the report already quoted, Professor Harvey's account of the habit of the plant: "It grows in patches on little ledges of the perpendicular side of the rock, along with *Gigartina mammillosa*, etc. It has quite a peculiar aspect when growing. The stipes or base of the stem is thick and rigid, and stands erect; while the fronds are just sufficiently limber to bend over but not to lie flat, so that the patch looks like a miniature grove of Weeping Willows."

W. CARRUTHERS.

British Museum.

ZOSTERA MARINA IN THE ORKNEY ISLANDS.

The *Zostera nana* has not been found in Orkney; and the error of its introduction into the 'Florula Orcadensis' (page 16 of this current

volume) should be corrected. *Zostera marina* was the species reported by Mr. Syme, as found on the coast of Orkney, which by some mischance has been changed into *Zostera nana* in transcribing the list. The most northerly localities certainly ascertained for *Z. nana* in Britain are in the counties of Northumberland, Ayrshire, and Argyleshire. —Hewett C. Watson.

ON THE OCCURRENCE OF *CALLUNA VULGARIS* IN AMERICA.

In an early number of the 'Journal of Botany' (Vol. I. p. 24), was reprinted a notice, by Professor Asa Gray, extracted from 'Silliman's Journal,' 1861, p. 290, on the occurrence of the common Ling (*Calluna vulgaris*) in Massachusetts, United States. In that notice it was stated, that Mr. Jackson Dawson had found the Ling about Tewkesbury, covering about half an acre of rather boggy ground; and Professor A. Gray added that it might have been introduced, unlikely as it would seem, or, like *Scolopendrium officinarum*, *Subularia aquatica*, and *Marsilia quadrifolia*, be a species of the Old World, so sparingly represented in the New as to be known only at single stations. A specimen of this *Calluna* was sent to England, and Professor Oliver, in reprinting the above notice (Nat. Hist. Rev. n. vii., July, 1862, p. 346), remarked: "We have seen a specimen forwarded to Dr. Hooker. It does not seem to differ in the least from the common Ling of our moorlands."

In Professor A. Gray's note it was also stated, that about thirty years ago an "English surveyor" had found the *Calluna* in the interior of Newfoundland, and that still earlier, De la Pylaie enumerated it as a native of that island. But in the Boston Natural History Society Proceedings, 1862, February, and 1863, May, Mr. Sprague remarked that he can find nothing of De la Pylaie's in print referring to the occurrence of this plant in Newfoundland, and that he has been informed by Mr. Durand that the Massachusetts Ling is a peculiar form, differing from the European in its larger and more globular flowers.

The doubt still lingering about the occurrence of this plant in America is dispelled by a lucky find of Mr. Hewett C. Watson.

Amongst the plants he bought at the sale of the Linnean Society's Collections in November, 1863, there was a parcel labelled outside, "A Collection of Dried Plants from Newfoundland, made by — MacCormack, Esq.,* and presented to Mr. David Don;" and in this parcel were found two specimens of *Calluna vulgaris*, with the following label:—"Head of St. Mary's Bay; Trepassey Bay also very abundant, S.E. of Newfoundland, considerable tracts of it." These specimens, as far as they go, agree exactly with our European ones, but unfortunately they have no flowers, and they do therefore not decide the knotty point raised by Mr. Durand, whether the American differs from the European plant in its "larger and more globular flowers." Professor Oliver, in the paragraph cited, says that the Massachusetts plant "does not *seem* to differ;" and when recently reverting to it ('Natural History Review,' January, 1864, p. 152), lays some stress upon, "the peculiar aspect of the Massachusetts plant compared with the European."

Mr. Watson's specimens place it beyond doubt that a plant very closely allied to, if not absolutely identical with the *Calluna vulgaris* of the Old World covers large tracts of Newfoundland, and they render it almost certain that the plant is also indigenous to Massachusetts, and not a mere colonist. Our *Calluna* was found by Gisecke in Greenland (see Brewster's Cyclopædia); it is common in Ireland, Iceland, and the Azores, and its extension to Newfoundland and the American continent is therefore not so much a paradox as a fact, at which we might almost have arrived by induction.—B. Seemann.

CORRESPONDENCE.

The American Woodsia glabella *in the Tyrol and Carinthia.*

13, *Craven Hill, Jan.* 28*th*, 1864.

In June last, whilst staying under the friendly shelter of the hospice of Auf der Plecken, on the south side of the Eailthal, Carinthia,—not so many miles from the only habitat for *Wulfenia Carinthiaca*,—I gathered from the face of a rock on the Plecken Alp four specimens of a Fern which I imagined at the time might belong to *Woodsia*. Several weeks later, when in Sextenthal, a valley which separates the terminus of the Carine Alps from the Dolomites of

* Probably W. E. Cormack (supposed to have been a merchant), who made several voyages to Newfoundland. In copying his name "Mr." was probably mistaken for "M'."

the Amfezzo route, I met a priest, a botanist, who gave me a specimen of *W. glabella*, which he had that year for the first time found in Sextenthal, but only in very small quantity. At the same time he called my attention to a Supplement of three or four pages by Hausmann to his 'Flora von Tirol.' I failed afterwards to procure a copy at Botzen and at Innspruck, but, to the best of my recollection, the notice in the 'Supplement' stated that Baron Hausmann found *Woodsia glabella* for the first time himself in 1860 or 1861 in Bragsthal, and that his specimens had been compared in Berlin with authentic ones of *W. glabella* brought by Sir J. Richardson from North America, and found identical. Lately I compared my Plecken specimens with that from Sexten, and with a frond from the west coast of Davis's Straits; and the suspicion then excited was reduced to certainty the other day, when Mr. Carruthers enabled me to compare both with two fronds of *W. glabella* brought by Sir J. Richardson from Great Bear Lake. If these comparisons be correct we have *W. glabella* from the Bragsthal and Sextenthal in Tyrol, about five miles apart, in Dolomite; and at Plecken in Carinthia, about twenty miles further eastward, along the same line of ridge, but on Kalk of the Carboniferous formation. G. C. Churchill.

NEW PUBLICATIONS.

A Run through the Assam Tea Gardens. By J. W. Masters. Folio. pp. 30. Golaghat. 1863.

Mr. Masters' devotion to the cause of botany in the Calcutta Botanic Gardens, and his diligence as a collector in Assam, have long been known to botanists. The above-named Report, comprising his journal of a tour through the Tea plantations of Assam, was presented to the Indian Government, with a view to its publication in the Transactions of the Horticultural Society of India. It is prefaced by a letter, from Major W. Agnew, the officiating Commissioner of Assam, to the Secretary to the Government of Brazil, which bears ample testimony to the public spirit and disinterested zeal of Mr. Masters. From this preface it appears that the object Mr. Masters had in view, in undertaking what is termed "a most laborious journey at the worst season of the year," was to collect all the information he could respecting the Tea-plant, and the conditions under which it grew. To attain this end he consulted meteorological registers, endeavoured to ascertain what effect cultivation has had upon the Tea-plant, to determine which are the best varieties to cultivate for the manufacture, what kind of soil is most suitable for the plant in general, as well as that adapted for any particular variety; to discover the best method

of cultivation, and to learn the most approved practice of manipulating the leaves. Information upon most of these points is given in the author's journal, and is the more valuable as coming from one who has played an important part in the establishment and development of Tea cultivation in Assam.

The meteorological records given by Mr. Masters accord well with those derived from other sources; from them it appears that Assam has a very damp, foggy climate, with a considerable, but not excessive, range of temperature. At Dibrooghur, according to information supplied by Rev. Mr. Higgs, there are on the average one hundred and sixty rainy days in the year, while the annual average rainfall amounts to one hundred and seven inches. The lowest temperature mentioned in the report is, 45° in January, at sunset; the highest, 128° in the sun at midday, in October.

The general character of the soil in which the Tea-plants flourish seems to be that of a friable clay, containing a large proportion of sand and a little oxide of iron, while near the surface it is mixed with rich vegetable-mould,—the latter derived from the dense forest and jungle, which have been cleared in order to allow the cultivation to be carried on. The country in the vicinity of the rivers appears to be undergoing great and rapid geological changes, owing to the cutting away of the river banks by the currents, the inundations in the wet season, and the formation of immense sand-banks. Of one of the latter, Mr. Masters writes :—

"*Dikho Mookh.* This is what was called the mouth of the Dikhomi; and at the very spot on which my tent is now pitched, ten feet above the water's level, the steamer 'Assam,' on her second voyage in September, 1842, was safely riding in three fathoms of water, now all filled up with fine sand, which is covered over with reeds, grass, Ferns, *Lantana Camara*, etc. . . . An immense sand-bank has been formed here, more than five miles in length and two in breadth, so that by the river at this season, the distance between Seebsagor and Dibrooghur is ten miles greater than it was in 1842." It is estimated that "106,325,892 tons weight of sand and other matter have been deposited in the great river at the mouth of the Dikho within the last twenty years; the earth is now accumulating and is deposited by the highest floods only. So soon as a little earth is deposited, plants begin to spring up, chiefly *Gramineæ*, such as species of *Imperata*, two or three species of Ferns, *Lantana Camara*, etc."

Some idea of the vegetation of this district may be gleaned from the frequent mention of some among the following genera, the species of which are most abundant in the Tea district :—

"The leading tree is *Gordonia integrifolia*, Roxb.; the leading shrub, *Melastoma Malabathricum;* the leading flower, *Exacum tetragonum;* the leading Grass, *Imperata cylindrica;* the leading Fern, *Hymenostachys dulcis*." With these, "*Osbeckia Wightiana* and *O. angustifolia*, as well as species of *Mussænda*, *Hedyotis*, *Randia*, *Styrax*, *Tabernæmontana*, *Panicum*, *Paspalum*, *Poa*, *Hypericum*, *Torenia*, *Vandellia*, *Gratiola*, *Hypoxis*, and *Burmannia*."

Elsewhere we find mentioned the following genera:—*Castanea*, *Aquilaria*, *Laurus*, *Artocarpus*, *Bignonia*, *Cordia*, *Cedrela*, *Jambosa*, *Mesua*, *Michelia*, *Lagerstræmia*, *Clerodendrum*, *Spermacoce*, *Mangifera*, *Dillenia*, *Dipterocarpus*, *Parkia*, *Nauclea*, *Terminalia*, *Eranthemum*, many Ferns, Grasses, etc. etc.

The reporter collected a very large number of the different varieties of the Tea-plant grown in Assam, and also specimens in illustration of the nature of the soil, as well as of the general geological character of the district. Great part of the report is taken up with a description of the numerous varieties of the Tea-shrub now in cultivation. Some of these were derived from the species indigenous to Assam, others from seeds originally sent from China. Some of the latter, Mr. Masters says, are "not worth cultivating in Assam for the manufacture of Tea, that produced from the indigenous plant being much superior," but this remark does not apply to all the plants of Chinese origin. The indigenous plant, which Dr. Seemann regards as the origin of all our various kinds of Tea, and figures in the 'Linnean Transactions, vol. xxii. t. 61, under the name of *Thea Chinensis*, from specimens collected by Mr. Masters, is said—

"To vary much in the shape of its leaves in a suitable soil and under good cultivation; the leaves are usually dark-coloured, smooth, firm, lanceolate, ovate-lanceolate or oblong-lanceolate, and tapering to a fine or blunt or emarginate point, variously dotted. The true character of this variety is that the leaves are copiously sprinkled with larger dots; the larger dots are sometimes in clusters, sometimes solitary." Mr. Masters "attaches considerable importance to the pellucid dots in the leaves, believing that the quality of the tea is affected thereby; and with regard to which the leaves of the different varieties differ greatly as respects number and size. The arrangement of the veins also is different."

Some information of a practical character is given as to the proper method of cultivating the shrub, and as to the best means of preparing the leaves for commercial purposes. The extent to which the cultivation and manufacture are now carried, may be judged from a perusal of these pages. Let one extract suffice:—

"*Nazerah.* This is a very busy place now, and upwards of 800 persons o both sexes and of all ages are moving quickly about in every direction; although just twenty-three years ago I was encamped here in the midst of dense jungle, while my own servants and boatmen ran away to the next village, through fear of the tigers, leaving me all alone in my tent, which, by the bye, was blown down in the night by a storm."

Index Fungorum Britannicorum. A Complete List of Fungi found in the British Islands to the present date, arranged so as to be applicable either as a Check List or for Herbarium Labels. By M. C. Cooke. London: R. Hardwicke.

The title of this little volume, which we have transcribed at length, sufficiently explains its object. In fifty-eight clearly-printed pages, it contains a list of all the known British Fungi, numbered throughout in serial order; the last having the large number of 3079 prefixed to it. The want of synonyms would be a serious defect, were it not for the reference that Mr. Cooke gives in his first page to Streinz's 'Nomenclator Fungorum,' which must be taken as the guide to his species in any case of doubt. We regret that this tribe of plants has so few students, and that consequently any volume treating of them can have only a limited circulation.

BOTANICAL NEWS.

An introductory lecture on botany, delivered in the Royal Agricultural College, Cirencester, in August last, by Mr. John Bayldon, has just been printed, and will be read with profit by those whose office it is to deliver similar lectures. Mr. Bayldon displays a thorough philosophical appreciation of botany, and in language of singular perspicuity and earnestness shows its value as a science and its relation to agriculture.

Mr. J. G. Baker, of Thirsk, is now editing, for the Tyneside Naturalists' Field Club, a new Flora of Northumberland and Durham, and would feel obliged for any information bearing upon the subject.

Dr. H. Wawra, who accompanied the Archduke Ferdinand Max of Austria to the Canaries, Cape de Verd, and Brazil, is about to publish the botanical results of this voyage, in which he will be assisted by Mr. F. Maly, Drs. Reichenbach, fil., Schott, and Krempelhuber. The work (price £6) will be in folio, containing about 80 pages of letterpress and 100 plates, 30 of which will be printed in colours by Messrs. Hartinger and Son, of Vienna, who were the first to apply that process to the illustration of natural history.

M. Naudin has been elected a member of the Botanical Section of the French Academy, in the place of the late M. Moquin-Tandon.

Mr. T. B. Flower, F.L.S., is publishing a Flora of Wiltshire, in the 'Wiltshire Archæological and Natural History Magazine.'

Mr. Henry Ibbotson, of St. Maurice's House, Barker Hill, York, announces 'The Geographical Distribution of British Ferns' (price 2*s.* 6*d.*), to serve as a handbook for collectors.

Signor Sanguinetti is publishing a Roman Flora.

Drs. Hooker and Thomson are going to bring out a new 'Flora Indica,' in nine or ten volumes.

Mr. James Bateman announces 'A Monograph on Odontoglossum,' in imperial folio, to be issued in parts; each part, containing five coloured plates, will cost £1. 1*s.* It is not stated how many parts will be published, but Mr. Lovell Reeve, the publisher, promises that no more than four parts shall be issued annually.

In his recently-published 'Dictionary of the Quichua Language,' Mr. Markham gives an interesting list of the names of plants used by the Incas, with their corresponding scientific names. It is singular that the Quichua name for Sweet Potato (*Cumar*), used in Ecuador, is identical with that (*Kumara*) we find in the principal islands of Polynesia, including New Zealand, Fiji, Society Islands, Samoa, etc.

It is our painful duty to record the deaths of three eminent botanists—Dr. Boott, of London, Mr. Woods, of Lewes, and M. Gay, of Paris.

Francis Boott, M.D., F.L.S., etc., eminent as a botanist, greatly distinguished by his enthusiastic love of science and of art, and endeared to a wide circle of friends by his sound judgment, his cultivated taste, the geniality of his disposition, and the warm kindliness of his heart, died at his residence in Gower Street, on Christmas Day last, in the 72nd year of his age. Born at Boston, in the United States of America, on the 26th of September, 1792, his early education was acquired at Harvard University; but at the age of seventeen he came to England, and resided for awhile in the neighbourhood of Derby. He afterwards studied in Edinburgh and at Paris, and having taken his degree of M.D. in 1824, he settled in London, and, for a time, gave lectures on Botany at the Webb Street School of Medicine, at which his friend Dr. Armstrong was Professor of Materia Medica. On the death of this friend, to whom he was greatly attached, he published a 'Memoir of the Life and Medical Opinions of John Armstrong, M.D.; to which is added an Inquiry into the facts connected with those forms of Fever attributed to Malaria and Marsh Effluvium,' 2 vols. 8vo. 1834. In this work he followed up and gave greater extension to Dr. Armstrong's opinions on the subject of fever, and added essentially to our knowledge of the laws which regulate its various types. His practice as a physician was at this time considerable, but having early inherited a competent fortune, he weaned himself from it by degrees, and devoted himself to the cultivation of his more congenial tastes in literature, art, and science. Taking up with ardour the study of the extensive genus *Carex*, he laboured at it almost to the last,

and this, his great botanical work, constitutes a striking proof of his devotion to his favourite science. Three parts, forming two volumes, and illustrated by 411 beautifully-executed folio plates, have been published; and it is stated that a large portion of a third, which would have completed the work, is all but ready for publication. It is one of immense labour and application, in which (as it has been observed) science and conscience are equally conspicuous, and will remain a lasting monument of minute and accurate investigation. On the establishment of the London University, afterwards University College, Dr. Boott became at once a member of its Senate and Council, and latterly President of its Committee of Council. But it was as a leading member of the Linnean Society that he was best and most extensively known among naturalists. He became a Fellow of that Society in 1819; from 1832 to 1840, he was Secretary; and from 1854 to 1861, Treasurer and Vice-President. At the meeting of the Society, on the 21st of January, a vote was unanimously passed, expressive of profound regret for the loss of a member so highly valued, so truly estimable in all the relations of life, and so distinguished for his eminent services to the Society and to science; and of sincere condolence and sympathy with his sorrowing family. In Dr. Boott we have lost one of the few remaining links which connect the present generation of botanists with those who preceded them; and as the intimate friend and chosen associate of Sir Joseph Banks, of Sir James Smith, and of Robert Brown among the departed, and of Sir William Hooker among the living, we cannot but look upon his memory with feelings of sincere and affectionate regard.

Mr. Joseph Woods was born at Stoke Newington, Middlesex, on the 24th of August, 1776. After having passed three or four years at two schools connected with the Society of Friends, to which persuasion his parents belonged, he was sent, when about thirteen or fourteen years of age, to Folkestone, sea-bathing having been prescribed on account of the state of his health. He here became acquainted with the late L. W. Dillwyn, with whom, then about the same age, much of his time was passed. At the age of sixteen, Mr. Woods was apprenticed to Mr. J. Beck, at Dover, and during his stay there paid some attention to botany; but it was not till some years later that, on revisiting Dover, he was fairly inoculated with a taste for that science by his friend Dillwyn, who had succeeded him there, and by whom he was introduced to the three brothers, Edward, Thomas Furley, and B. M. Forster, and subsequently to Sir Joseph Banks's breakfast table, where naturalists of every class and of all ages seem ever to have been heartily welcomed. Disliking his occupation at Dover, Mr. Woods, at the close of his apprenticeship, placed himself as a pupil with Mr. Alexander, to study architecture, and devoted himself for some years to the practice of that profession. During this period (in 1806) he united with a few friends to found the London Architectural Society, of which he appears to have been the first President, contributing a number of valuable essays, some of which were published. While thus actively engaged in the duties of his profession, Mr. Woods still found time to prepare that elaborate monograph of the difficult genus *Rosa*, in which he first pointed out the importance of the setæ in distinguishing species.

This work, read before the Linnean Society in 1816, and published in the twelfth volume of their Transactions, at once established his reputation as a systematic botanist. The fall of Napoleon having opened the Continent to English tourists, Mr. Woods determined to avail himself of the opportunity to study some of the best examples of architecture in foreign lands. With this view, he passed about four years in a tour through France, Switzerland, Italy, Sicily, and Greece, during which he formed a most extensive collection of sketches and critical notes upon the principal public buildings which came in his way. The results were given to the world in 1828, in two quarto volumes, under the title of 'Letters of an Architect,' etc., a work of which the late Mr. Britton speaks in terms of high commendation, and which has gradually become one of the text-books of the profession. He also edited the fourth and concluding volume of that magnificent work, Stuart's 'Athens.' On his return to England in 1819 or 1820, he took up his abode in Furnival's Inn, where he remained till 1830, and where he devoted much of his time to the arrangement of his botanical collections. These were afterwards greatly augmented during several successive visits to the Continent, in which, though he did not wholly ignore architecture, he gradually came to regard botany as his profession. The botanical notes made during these Continental excursions, and in others within the British Islands, were communicated, either to his old friend Sir W. J. Hooker, for publication in the 'Companion to the Botanical Magazine' (viz. "Botanical Excursion in the North of England, in 1835," and "Account of a Botanical Excursion into Brittany, in 1836"), or, subsequently, to the 'Phytologist,' in the successive volumes of which appear—"Notes of a Botanical Excursion in France, in 1843" (vol. i.); Notes on a Botanical Tour in Germany, in 1844" (vol. ii.); "Notes of a Botanical Excursion in Hants in 1849" (vol. iii.); "Letter to R. Brown, Esq., P.L.S., containing Botanical Memoranda of a Visit to France, in 1851" (vol. iv.); "On the Botany of the Great Orme's Head, Carnarvon, in 1855" (new series, vol. i.); "Some Botanical Notes made during a Tour through a part of Ireland in 1855" (*ib.* new series, vol. i.). His last journey on the Continent was made in the summer of 1857, when he was already upwards of eighty years of age; and the results, under the title of "Notes of a Botanical Ramble in the North of Spain," were read before the Linnean Society in November, 1857, and published in the second volume of its Journal. During the last thirty years of his life, Mr. Woods resided at Lewes, in Sussex, devoting much of his time to the investigation of the botany of the county, a pursuit which naturally brought him into frequent communication with the venerable W. Borrer, whom he had long known, and whose death in January, 1862, must have been deeply felt by one who had survived so many of the scientific friends of his early days. In 1850 appeared his 'Tourist's Flora,' a work upon which he had been engaged during many previous years, and which, embracing, as it does, a much larger portion of Europe than had been included by any previous author of recent date, has become an indispensable *vade mecum* of the English traveller on the Continent. Down to the day of his decease, Mr. Woods was steadily occupied in the preparation of a second edition of this work, for which he had collected an ample store of

materials. Among his varied attainments, he was an admirable artist, and had gradually accumulated an extensive series of sketches, which, even to the close of his life, were remarkable for their accuracy and for the firmness of the pencilling. Many of the latest of these sketches were made in connection with a revision of the perplexing genus *Rubus*, upon which he had already published something in the 'Phytologist' (new series, vol. i.), and on which he was occupied during great part of the past summer and autumn. It thus proved to be the last of his botanical labours, as the revision of the allied genus *Rosa* had been his first. In addition to the above-mentioned "Synopsis of the British Species of *Rosa*," which appeared in the twelfth volume of Linn. Trans., the following papers were communicated by him to the Linnean Society, and published in their Transactions, Journal, etc.:—1. "Observations on the Species of *Fedia*," in 1835 (Trans. vol. xvii.). 2. "Observations on the Genera of European Grasses," in 1837 (*ib.* vol. xviii.). 3. "On *Crepis biennis* and *Barkhausia taraxacifolia*," in 1841 (*ib.* vol. xix.). 4. "An Attempt to Arrange the *Carices* of Middle Europe," 1844 (*ib.* vol. xix.). 5. "Remarks on the Genus *Atriplex*," in 1849 (Proceedings, vol. ii.). 6. "On the Various Forms of *Salicornia*," in 1851 (*ib.* vol. ii.). 7. "Notice of his Botanical Notes made during a Tour in France," in 1852 (*ib.* vol. ii.). 8. "Notes of a Botanical Ramble in the North of Spain," in 1857 (Journal of Proc., § Botany, vol. ii.). Mr. Woods was for upwards of sixty years a Fellow of the Linnean Society, of which he lived to be nearly the oldest member. He was also a Fellow of the Geological Society and of the Society of Antiquaries, and an Honorary Member of the Society of British Architects, now so ably presided over by his old fellow-traveller, Professor Donaldson. His name will be perpetuated among botanists by the interesting genus of Ferns dedicated to him by the late Mr. Robert Brown, in the eleventh volume of the Trans. Linn. Soc., and so exquisitely illustrated by drawings from the pencil of Francis Bauer; by a species of *Rosa*, appropriately named in honour of him by Dr. Lindley, in his 'Rosarum Monographia'; and by the beautiful Irish *Jungermannia*, first discovered by himself, and named after him by Sir W. J. Hooker in his admirable work on the British *Jungermanniæ*, and also described and figured in the 'Supplement to English Botany,' to which work Mr. Woods was an occasional contributor, and where Sir William Hooker speaks of him as one of our ablest British botanists. He died, at his residence in Southover, on Saturday, the 9th of January, in his 88th year.

M. Jacques Étienne Gay died at Paris on January 16th, 1864, at the age of 77 years. His loss to our science is inestimable, and those who were honoured with his friendship will feel his absence from amongst us to a very painful degree. Although not a voluminous writer, it would be very difficult to name a botanist to whom we are more indebted for advancing the scientific knowledge of European plants.

Errata.—Page 16, second column, line 21 from above, *read* "Zostera *marina*," *for* "*nana*." P. 31, l. 13 from above, put a full-stop after "Braun;" and l. 14, leave out full-stop after "*ancylopoda*."

W. Fitch, del. et lith.

Vincent Brooks, Imp.

ON *GENTIANA GERMANICA*, *Willd.*

By C. C. Babington, M.A., F.R.S.

(Plate XV.)

There has been much discussion concerning two questions, but it has not resulted in any definite determination of either of them. They are, (1) have we the true *G. Germanica* as a native plant in England; and (2) is that supposed species distinct from *G. Amarella?* I have never seen any English specimens that I could suppose to be *G. Germanica*, except a few gathered near Tring, in Hertfordshire. These present a rather different appearance from those usually called *G. Amarella* by us. They have larger and more decidedly funnel-shaped flowers, and apparently their germens are more decidedly stalked than those of our other plants. But a careful examination led me to suppose that the latter character, although relied upon by Continental botanists, was not sufficiently constant to separate the plants specifically. I have often found stalks to the germens of specimens which I confidently named *G. Amarella*. As no other character of value had been pointed out, it seemed best to consider the *G. Germanica* a form of *G. Amarella*. Dr. Grisebach, the greatest authority on *Gentianaceæ*, supposed, and still supposes that it is a constant character, and continues to use it as one of the distinctions of the plant. He even went so far as to believe that all our plants are *G. Germanica*, for he states that until very recently, every specimen that he had seen belonged to that supposed species; but now he allows that some sent to him by Dr. Seemann, which had been gathered in Cambridgeshire by the Rev. W. W. Newbould, are the true *G. Amarella*, but adds that he had seen others obtained in Scotland. He refers to Grisebach and Schenk's 'Iter Hungaricum,' in Wiegmann's 'Archiv für Naturkunde,' 1852, p. 331, for his last remarks upon the subject. He there says: "*G. Germanica*, W., et *G. Caucasica*, M. B., ab omnibus Gentianeis ipsi notis recedunt æstivatione corollæ ita quincunciali, ut lobus quintus ab utroque latere occultetur, bini oppositi valvatim juxtaponantur, tertius cum lobo utroque adjacente æstivatione contorta dextrorsa, quartus sinistrorsa confluat." Also, he adds, that *G. Amarella* has the lobes "dextrorsum contortis," and a sessile capsule. Now if this is really a

constant character, we have a good distinction between the plants; but unfortunately one that is not easily seen, except when the specimens are fresh. Our artist does not seem to have attended to this part of the structure, for, although he represents at least one of the opening flowers as having the æstivation attributed to *G. Germanica*, some of the others are (to say the least) drawn so as to admit of doubt, even if he has not given these the dextrorse contorted æstivation of *G. Amarella*. I could have wished that the matter should have been left undecided until after another summer had given us a chance of examining the fresh plant, but learn that the Plate must now appear. I however retain my own doubts, and strongly suspect the value of the æstivation as a constant character in this case. The specimen figured (one of the smaller of some gathered in the parish of Buckland, in Buckinghamshire, and kindly sent by Mr. H. H. Crewe) has been compared with the examples of *G. Germanica* in Willdenow's Herbarium at Berlin, by Dr. Carl Bolle, "a good critical botanist," and he states that they are "absolutely identical."

Dr. Grisebach has kindly sent bits of his two plants to illustrate the difference in the germen. It will be seen by the extracts from his letters annexed to these remarks, that he is very decidedly of opinion that the form of the germen is a good character. He refers us to Reichenbach's 'Icones' for illustrations. I have examined the specimens and the plates quoted. In the specimens I find that the *G. Amarella* has a short but decided stalk to its germen, and do not think that a slight difference in the length (for that is all that I can make out) is sufficient for specific distinction. According to Reichenbach's figures the *G. Amarella* has an absolutely sessile germen, whilst that of *G. Germanica* is very decidedly stalked,—a different condition, as it seems to me, from that of Grisebach's specimens, and equally different from the result of my own former observations. I believe that the *G. Amarella* always has a real stalk to its germen, short indeed, often very short, but yet only differing in degree from the long stalk of *G. Germanica*. It is not pleasant to differ from so high an authority as Dr. Grisebach, but there would be no advance in botany if we allowed ourselves to be prevented from stating what seem to be facts, even in deference to the greatest men. Doubtless I am more likely to be in error than Dr. Grisebach, but perhaps my statement of a different opinion may lead him to reconsider the question, and point out decided

characters to separate the plants. I hope also that some of our acute English observers will turn their attention to it, and record the results at which they may arrive. The object that we all have in view is the discovery of the truth, and, so that that is discovered, it matters not who is right and who is wrong.

The following are extracts from Dr. Grisebach's letters to Dr. Seemann :—

Göttingen, September 17, 1863.

The plant which you have figured (Plate XV.) is *Gentiana Germanica*, so widely diffused, and almost daily observed by me in the Styrian Alps during a recent tour. *Gentiana Amarella* (*uliginosa*, Willd.) is an Eastern species, probably not found in England, with a *sessile* capsule. The principal forms of *G. Germanica* differ in the æstivation of the corolla in a remarkable degree from the character of the Order. (Conf. my and Schenk's 'Iter Hungaricum,' p. 331, in Wiegmann's 'Archiv für Naturkunde,' 1852.) Transitions between *G. Germanica* and *G. Amarella* I have never seen, but I have found hybrids between *G. campestris* and *G. Germanica*. *G. Germanica* grows chiefly in dry calcareous soil; *G. Amarella* in swampy meadows, principally in the Russian, and sporadically in the Baltic plains.

Seeing that Dr. Grisebach doubted the existence of the true *G. Amarella* in England, Dr. Seemann sent him a specimen collected by the Rev. W. W. Newbould in Cambridgeshire, and obtained the following letter :—

Göttingen, January 18, 1864.

The Gentiana you sent is really the *true G. Amarella*, which hitherto was known to me only from Scotland, not from England. But as I may have already told you, the chief character does reside, according to my opinion, *not* in the æstivation (remarkable as in the common form of *G. Germanica* it may be), but in the formation of the base of the capsule, as you will see from the enclosed specimens of two German forms. The slender carpophorum of *G. Germanica* and *obtusifolia* (destitute as it is of seed), does not exist in your English *G. Amarella* (conf. Reichb. Icon. Germ. in vol. xvii. t. 5 and 6).

It might perhaps be desirable to give figures of the remarkable æstivation of *G. Germanica*, but this feature is *not* reliable as a specific character, and could not be used for generic purposes. In writing my memoir on *Gentianaceæ* in De Candolle's 'Prodromus,' I was aware of this distinction in *G. Germanica* and *Caucasica*, without, however, interpreting it correctly. Afterwards ('Iter Hungaricum,' l. c.) I have carefully described the æstivation of *G. Germanica*, and regarded *G. obtusifolia* (which has the common 'æstivatio contorta') as well as *G. Caucasica*, as distinct species on account of their æstivation.

But as the other distinctions of these forms are not constant, and I have seen cases where in the same individual the *two* different æstivations occur, I am inclined to think my original opinion the correct one. I fancy I remember (but have unfortunately no written record of it) that in *G. Germanica* the terminal

flower of the principal axis has the common contorted æstivation, whilst all others have a quincuncial. The subform γ. *præcox*, De Cand. Prod. would therefore be distinguished by *all* its flowers being contorted as in *G. Amarella* and the typical plants of the whole Order. But all these things must be observed on excursions, as in dried specimens misplacements of the lobes of the corolla not unfrequently happen, and doubts may arise about the æstivation.

A. Grisebach.

Explanation of Plate XV.

Gentiana Germanica, Willd. From specimens kindly forwarded by Mr. H. H. Crewe.—Fig. 1. A flower. Fig. 2. The same laid open, to show the germen and its stalk. Fig. 3. A stamen. Fig. 4. A separate germen. Fig. 5. A nearly ripe capsule. One opening flower, near the top of the Plate, shows the quincuncial æstivation.

ON ONAGRACEÆ AND HYDROCHARIDACEÆ AS ELUCIDATING THE VALUE OF RAPHIDES AS NATURAL CHARACTERS.

By George Gulliver, F.R.S.

That such an Order as *Onagraceæ* may, in the British Flora, be well and truly distinguished from its nearest allies simply by the character of raphis-bearing, we have repeatedly proved. But whether this remarkable difference is universal remains to be determined; and, as the inquiry is an important and extensive one, I shall now open it with notes of the few observations which I have yet made as to this point. The term raphides will be here used for the needle-forms which commonly occur in bundles; for much perplexing obscurity has arisen from confounding them with sphæraphides and other minute crystals, as more fully explained in the 'Annals of Natural History' for September last.

When not otherwise implied, leaves of the following plants were examined, and compared with corresponding parts of *Clarkia*, *Eucharidium*, *Godetia*, and *Fuchsia*; these four genera of *Onagraceæ* having, like all their congeners hitherto examined in this point of view, been found to abound in raphides. Whereas, after the most careful search, no raphides were found in any of these following plants:—*Philadelphus coronarius*, *Deutzia scabra*; *Eugenia Ugni*, officinal Cloves, Allspice, Brazil nuts, and Pomegranate fruit; *Haloragis alata*, *Loudonia*, sp.; *Loasa argemonoides*, *L. acanthifolia*, *Mentzelia oligosperma*, and *Bartonia* (*B. nuda?*)

But they often contained sphæraphides; as was beautifully seen in *Haloragis*, and especially in thin slices of the stem and leaves of *Loudonia*; they should be compared with similar objects in *Ixora* and *Gardenia*, and in the rind of the fruit of *Opuntia vulgaris*.

At present, I have no opportunity of referring to our highest authority (Lindley's 'Vegetable Kingdom') on the alliances of *Onagraceæ*. In Professor Balfour's valuable 'Manual of Botany' the Orders run thus:—78, *Philadelphiaceæ*; 79, *Myrtaceæ*; 80, *Onagraceæ*; 81, *Haloragaceæ*; 82, *Loasaceæ*. Now, still excepting *Onagraceæ*, all the above-named plants belong to these different Orders; and while *Onagraceæ* is an Order regularly abounding in raphides, every native and exotic plant, hitherto examined in relation to this question, of the next allied Orders, has been found destitute of raphides.

And, conversely, as far as my observations yet extend, a single Order, of which *Hydrocharidaceæ* affords an example, may be characterized as devoid of raphides, and yet standing between Orders abounding in raphides. For, while these acicular crystals were always found in *Paris quadrifolia*, *Tamus communis*, *Dioscorea Batatas*, *Testudinaria elaphantipes*, roots of *Sarza*, and in such British and foreign *Orchids* as I have hitherto examined, raphides could not be discovered either in *Vallisneria spiralis*, *Anacharis Alsinastrum*, *Stratiotes aloides*, or *Hydrocharis Morsus-ranæ*.

Several other examples to the same effect as those of *Onagraceæ* and *Hydrocharidaceæ* probably exist. But my observations are yet by no means sufficiently comprehensive to afford more than rational hypotheses which indicate the necessity for further research in this direction. Thus, such Orders as *Balsaminaceæ*, *Ficoidæ*, *Alismaceæ*, and *Potamogetonaceæ*, especially invite more inquiry, since the results of the few examinations which I have made of these Orders and their allies, show raphis-bearing Balsams, immediately surrounded by Geraniums and Flaxes, Oxalids and Indian Cresses, in which (on the contrary) raphides are not found; raphis-bearing Ficoids, standing between House-leeks and Indian Figs without raphides; Water Plantain and Pondweeds destitute of raphides, which nevertheless abound in all the Orders placed between these two genera in Professor Babington's 'Manual of British Botany.'

But the whole subject is so vast as to be quite beyond the powers of an out-door naturalist, mostly confined to the narrow sphere of a rural

district, and far from the assistance of botanical collections. Indeed, the present observations on *Haloragaceæ* and *Loasaceæ* could not have been made but for the courtesy of Dr. Hooker in supplying me with fragments of the plants for the purpose. So numberless are the species yet requiring examination, that the co-operation of many observers will be required before we can hope for a fair and practical knowledge of the distribution of *raphides* throughout the vegetable kingdom, and of their exact value as characters in systematic botany. I have only been able to commence the inquiry, and to show that they are certainly sometimes so important in this respect as to prove truly diagnostic; and that, whenever they afford a diagnosis, it may be more fundamental and universal, either in the species or Order, than any other single character hitherto employed for the purpose. Among numberless examples in our own Flora, let any one examine such plants as *Epilobium* and *Lythrum*, the former, at every period of its growth from the seed-leaves to the fruit, will always be distinguishable from the latter by the *raphides* alone. Hence, this is the only one character which is never failing for the diagnosis. Nor can it be doubted that a phenomenon so remarkable and constant is an essential, significant, and intrinsic function of the plant-life; and that this eminently natural character of raphis-bearing should no longer be neglected, as it has hitherto been, in systematic botany.

Edenbridge, February 15, 1864.

NEW SOUTH SEA ISLAND PLANTS.

By Berthold Seemann, Ph.D., F.L.S.

Dr. F. Mueller, of Melbourne, has kindly forwarded to me for incorporation in my forthcoming works on Polynesian Botany, a collection of plants made by Dr. Græffe, a Swiss *savant*, who is now exploring the various groups of the Pacific, and whose expenses are paid by Messrs. Godeffroy and Sons, a large Hamburg firm, who carry on extensive mercantile operations in the South Seas. Dr. Græffe devotes himself principally to zoology, but that he does not neglect botany will be seen from the enumeration of a collection he made during his short stay in the Viti group, and in Uvea or Wallis Island, 1862. Dr. Mueller thought that it might be an encouragement to Dr. Græffe if this col-

lection were at once published, and I gladly accede to his wish by printing a preliminary list, to which I shall add the description of several new genera and species. Dr. Græffe made several highly-important additions to the Vitian Flora, among them one entirely new genus of *Tiliaceæ*, with large stipules and calyculate flowers, which I have named in honour of its discoverer (*Græffea*), also a new *Elæocarpus* (*E. Græffei*). He also transmits flowering specimens of a Vacciniaceous plant, which I had previously only found in fruit, and referred provisionally to *Epyginum*. I am now enabled to describe it as a perfectly new genus, which, on account of its beauty, may bear one of the names of Aphrodite (*Paphia*). There are, besides, flowering specimens of my *Podocarpus (?) Vitiensis*, and acceptable additions to materials of a new genus of Palms, originally discovered in Viti Levu by Mr. Jacob Storck (see Journ. Bot. 1863, p. 190). Also *Dicksonia Berteroana*, Kunz., and several other plants never before found in the Viti group.

I believe no list of plants from Uvea or Wallis Island, situated between Viti and Samoa, has as yet been published, and no one but Sir E. Home has ever collected there. With the exception perhaps of a *Rubiacea*, not yet made out satisfactorily, all the species Dr. Græffe gathered there were previously known, and most of them are common throughout Polynesia; but several others, for instance, *Aglaia Samoënsis*, A. Gray, *Eugenia clusiæfolia*, A. Gray, etc., had hitherto been found only in the Samoan archipelago.

Dicotyledones.

***Uvaria odorata*, Lam., Uvea (n. 22).**
***Sida rhombifolia*, Linn., Uvea (n. 44).**
***Paritium tiliaceum*, Juss., Uvea (n. 47).**
***Triumfetta procumbens*, Forst., Uvea (n. 36).**
Trichospermum Richii, Seem., Viti Levu (n. 25).
***Græffea calyculata*, Seem., Viti Levu (n.).**
Elæocarpus Græffei, Seem., sp. nov., Viti Levu (n. 59).
***E. Storckii*, Seem., Viti Levu (n. 49).**
Calophyllum inophyllum, Linn., Uvea (n. 33).
***Aglaia Samoënsis*, A. Gray, Uvea (n. 46).**
Dodonæa viscosa, Linn., Uvea (n. 50), Viti Levu (n. 31).
***Hiptage myrtifolia*, A. Gray, Viti Levu (n. 18).**
***Evodia hortensis*, Forst., Viti Levu (n. 43).**
***E. longifolia*, A. Rich, Uvea (n. 23).**
***Erythrina Indica*, Linn., Viti Levu (n. 61).**

Pongamia glabra, Vent., Viti Levu (n. 29).
Sophora tomentosa, Linn., Uvea (n. 38).
Inocarpus edulis, Forst., Uvea (n. 34).
Acacia Richii, A. Gray, Viti Levu (n. 19).
Parinarium laurinum, A. Gray, Uvea (n. 19).
Eugenia Brackenridgei, A. Gray, Viti Levu (n. 50).
E. confertiflora, A. Gray, Viti Levu (n. 32).
E. clusiæfolia, A. Gray, Uvea (n. 30).
Nelitris fruticosa, A. Gray, Uvea (n. 24).
Medinilla heterophylla, A. Gray, Viti Levu (n. 60).
Melastoma Taitense, De Cand., Uvea (n. 51).
Haplopetalon Seemanni, A. Gray, Viti Levu (n. 44).
Spiræanthemum Vitiense, A. Gray, Viti Levu (n. 16).
Geissois ternata, A. Gray, Viti Levu (n. 27).
Loranthus Insularum, A. Gray, Viti Levu (n. 21).
Geophila reniformis, Ch. et Schl., Uvea (n. 39).
Morinda bucidæfolia, A. Gray, Viti Levu (n. 52).
Ophiorrhiza peploides, A. Gray, Viti Levu. (n. 34).
Gardenia Taitensis, De Cand., Uvea (n. 28).
Mussænda frondosa, Linn., Uvea (n. 21).
Rubiacea, Uvea (n. 32).
Rubiacea, Viti Levu (n. 63).
Rubiacea, Viti Levu (n. 46).
Scævola floribunda, A. Gray, Viti Levu (n. 41).
S. Kœnigii, Vahl, Uvea (n. 41, 45).
Cyrtandra Pritchardii, Seem., Viti Levu (n. 42, *ex parte*).
Paphia Vitiensis, Seem. (*Epyginum ? Vitiense*, Seem.), Viti Levu (n. 45).
Sapota (?) pyrulifera, A. Gray, Uvea (n. 40).
Mæsa corylifolia, A. Gray, Viti Levu (n. 57).
M. nemoralis, A. De Cand., Uvea (n. 29).
Ardisia, sp. (=Seem. n. 29), Viti Levu (n. 22).
Geniostoma crassifolium, Benth., Uvea (n. 42).
Alyxia bracteolosa, Rich., var. Uvea (n. 35).
Cordia subcordata, Lam., Uvea (n. 43).
Solanum Vitiense, Seem., Viti Levu (n. 42, *ex parte*).
Eranthemum laxiflorum, A. Gray, Viti Levu (n. 51).
Vitex trifolia, Linn., Uvea (n. 20).
Premna Tahitensis, Schauer, Uvea (n. 27).
Teucrium inflatum, Swartz, Uvea (n. 26).
Drymispermum montanum, Seem., Viti Levu (n. 48).
Acalypha grandis, Benth., Uvea (n. 25).
A. sp., Viti Levu (n. 30).
A. sp., Viti Levu (n. 62).
Omalanthus pedicellatus, Benth., Viti Levu (n. 17).
Aleurites triloba, Forst., Uvea (n. 17).
Phyllanthus fruticosa, Wall., Uvea (n. 18).

Breyenia disticha, Forst., Viti Levu (n. 28).
Bœhmeria Harveyi, Seem., Viti Levu (n. 20).
Ficus sp. (=Seem., n. 443), Viti Levu (n. 53).
Ascarina polystachya, Forst., Viti Levu (n. 40).
Peperomia pallida, Hook. et Arn., Viti Levu (n. 39).
Macropiper puberulum, Bth., Uvea (n. 31).
Casuarina equisetifolia, Forst., Uvea (n. 52).
C. nodiflora, Forst., Viti Levu (n. 64).
Dacrydium elatum, Wall., Viti Levu (n. 23).
Podocarpus (?) Vitiensis, Seem., Viti Levu (n. 1).

MONOCOTYLEDONEÆ.

Corymbis disticha, Lindl., Viti Levu (n. 24).
Orchidea, Viti Levu (n. 23).
Orchidea, Viti Levu (n. 33).
Cordyline, sp., Uvea (n. 53).
Gen. nov. *Palmarum*, Viti Levu (n. 67).
Mariscus lævigatus, Rœm. et Schult., Viti Levu (n. 35).
Kyllingia, sp., Viti Levu (n. 55).
Elæocharis (*gracilis*, R. Brown?), Uvea (n. 15).
Bambusa, sp., Uvea (n. 49).
Andropogon Schœnanthus, Linn., Uvea (n. 16).

ACOTYLEDONEÆ.

Psilotum triquetrum, Sw., Uvea (n. 18).
Lycopodium cernuum, Linn., Uvea (n. 1); Viti Levu (n. 11).
Lycopodium, sp. (=Seem. n. 706); Viti Levu (n. 12).
L. flabellatum, Forst., Viti Levu (n. 65).
Vittaria elongata, Sw., Viti Levu (n. 4).
Phymatodes longipes, J. Smith, Uvea (n. 5).
Nephrolepis hirsutula, Presl, Uvea (n. 2).
Davallia fœniculacea, Hook., Viti Levu (n. 8).
D. gibberosa, Swartz, Viti Levu (n. 2, 10).
Synaphlebium davallioides, J. Smith, Viti Levu (n. 6).
S. repens, J. Smith, Uvea (n. 10).
Trichomanes Javanicum, Bl., Viti Levu (n. 56).
T. meifolium, Bory, Viti Levu (n. 14).
Angiopteris evecta, Hoffm., Uvea (n. 9).
Lygodiction Forsteri, J. Smith, Viti Levu (n. 36).
Schizæa dichotoma, Swartz, Uvea (n. 14).
Ophioglossum pendulum, Linn., Viti Levu (n. 69).
Blechnum orientale, Linn., Uvea (n. 4, 12).
Pteris quadriaurita, Hook. Uvea (n. 6).
P. crenata, Swartz, Uvea (n. 8, 11).
Asplenium obtusilobum, Hook., Viti Levu (n. 5).
A. laeserpitifolium, Lam., Viti Levu (n. 66).
Antrophytum reticulatum, Kaulf., Viti Levu (n. 13).

A. semicostatum, Bl. (*alatum*, Brack), Viti Levu (n. 3).
Doodia connexa, Kunze, Viti Levu (n. 15).
Dicksonia Berteroana, Hook., Viti Levu (n. 7).
Diplazium bulbiferum, Brack., Uvea (n. 13).
Sphagnum cuspidatum, Ehrh., Viti Levu (n. 37).
Hypnum? sp., Viti Levu (n. 59).
Marchantia pileata, Mitten., Viti Levu (n. 54).

Bæckea *nelitrioides*, Seem. n. sp.; fruticosa; ramulis foliis, pedunculis calycibusque cano-tomentellis demum glabris; foliis oppositis, ellipticis, obtusis, subtus punctatis; pedunculis axillaribus, 3–5-floris, bracteolatis; calycis laciniis oblongis, obtusis; petalis (albis) 5, obovatis, obtusis, puberulis; staminibus 10; filamentis basi hirsutis, apice eglandulosis; ovario villoso, 3-loculari; stylo basi villoso; capsula 3-loculari.—New Caledonia (*Sir E. Home!, in Brit. Museum*), collected in 1846.

Has very much the look peculiar to *Nelitris*, and has leaves larger than any other species of *Bæckea* known to me, 1 inch long, and $\frac{1}{4}$ of an inch broad. Petiole very short.

Medusanthera, *gen. nov. Icacinearum.—Char. Gen. Flores* polygami v.? hermaphroditi. *Calyx* cupuliformis, obscure 5-dentatus. *Petala* 5, hypogyna, obovata, incurva, æstivatione valvata. *Discus* inconspicuus. *Stamina* 5, hypogyna, petalis alterna; filamentis compressis, apice ad latus interius in ramos 8 longissimos clavatos dilatatis. *Antheræ* erectæ, biloculares. *Ovarium* ovato-conicum (1-ovulatum?). *Stigma* sessile. *Fructus* . . . .—Arbor Vitiensis, mediocris, subglabra, ramis pendulis; foliis alternis, exstipulatis, petiolatis ovato-oblongis, longe acuminatis, integerrimis, penninerviis; floribus axillaribus, cymosis, albidis; cymis 2–3-chotomis, pedunculis bracteis lanceolatis minutis instructis. Species unica :—

1. Medusanthera *Vitiensis*, Seem. mss.; *Stemonurus?*, sp. Bonpl. x. p. 296.—Bureta, Island of Ovalau (*J. Storck!, n.* 877), where, according to its discoverer, it is called "*Duvu.*"

Medusanthera is closely allied to *Lasianthera*, but the anthers, instead of having numerous thin and long hairs on the base of the inner side, have in this genus only eight long clavate threads, which cover them in æstivation in the same way as the hairs do in *Lasianthera*, and they seem to be branches of the filaments. The calyx, also, is not 5-lobed, as in *Lasianthera*, but cup-shaped, and with five obscure teeth, and on the whole margin ciliolate; the inflorescence is more truly cymose. Un-

fortunately Mr. Storck's specimens have only male flowers; at least, the ovary appeared to be abortive and one uniform black mass. *M. Vitiensis* is a middle-sized tree, with terete hanging branches. Leaves 3 inches long, 1 inch broad; petiole ¼ inch long. Peduncles longer than the petiole. Flowers minute. Filaments flat, broader towards the apex. Branches twice as long as the anthers. Petals glabrous, almost cucullate at the apex, and without apparent veins. Pedicels with minute hair.

Trachymene (*Didiscus*) *Homei*, Seem. n. sp.; caulescens, glaberrima; foliis inferioribus longe petiolatis, 3-sectis, laciniis 2-pinnatifidis, segmentis ultimis linearibus acutis, superioribus breviter petiolulatis v. sessilibus; umbellis simplicibus, terminalibus, aggregatis (3–6); involucro 10–12-phyllo, laciniis lineari-lanceolatis, longe acuminatis; pedunculis compressis; floribus . . .; fructibus lævibus, glaberrimis, carpophoro 2-partito.—Isle of Pines, off New Caledonia (*Sir E. Home!, in Mus. Brit.*), v. s. s. flor.

Entire plant about 1 foot high, apparently perennial. The peduncles surrounding a flat disk, as in *Trachymene cærulea*, Grah. (*Didiscus*, Hook.), and a few of the external flowers of the umbel being abortive; fruit orbicular, cordate at base.

The original species upon which Rudge established the genus *Trachymene* in the Linnean Transactions (x. p. 300, t. 21, fig. 2) was *T. incisa*, which must be regarded the type of the genus; and if it be generically identical with the more modern genus *Didiscus*, the latter must be suppressed. Rudge, in the place quoted, does not describe any other species of *Trachymene*, though De Candolle burdens him with the authority of *T. lanceolata* and *T. ovata*. The æstivation of *Trachymene cærulea* is vexillary; the outermost petal being quite free, and overlaps those placed right and left of it. The latter two overlap the two following, which on one side are valvate.

Alsodeia (?) *Storckii*, Seem. n. sp.; glabra; ramulis geniculato-flexuosis, foliis brevissime petiolatis v. sessilibus ovatis v. ovato-oblongis acuminatis integerrimis, stipulis ovato-lanceolatis, floribus axillaribus solitariis (viridibus), calycis laciniis 5 oblongis obtusis, petalis . . ., staminibus . . ., capsula ovato-oblonga obtusa 3-valvi, seminibus numerosis subglobosis glabris grani Piperis magnitudine. "Seirakavono" incolarum.—Port Kinnaird, Ovalau (*Storck!, n.* 867).

This plant may possibly be the type of a new genus, but there being

only fruiting specimens, I have provisionally placed it in *Alsodeia*, though the numerous seeds are rather opposed to its admission. I do not find anything like it either in the Kew or British Museum Herbaria. Mr. Storck says ('Bonplandia,' x. p. 295), "the flowers are greenish and the fruit yellow." The leaves, when in very young bud, are covered with silky, whitish hairs; but after expansion they are perfectly glabrous, the largest being 5 inches long and from 2–2½ inches broad. Capsule ¾ of an inch long, drooping.

Elæocarpus *Græffei*, Seem. n. sp.; ramulis petiolis pedunculis pedicellis calycibusque rufo-tomentellis, foliis obovatis v. oblongis acuminatis basi obtusis dentatis coriaceis utrinque glabris subtus pallidioribus, racemis ex axilla foliorum delapsorum nascentibus 8–12-floris, floribus parvis nutantibus solitariis v. geminis, sepalis ovato-lanceolatis acutis æstivatione valvatis extus 1- intus 3-nerviis, petalis fimbriatis (albidis) glabris, staminibus numerosis glabris, antheris longe aristatis, ovario villoso 2-loculari, drupa . . . —Viti Levu (*Græffe!*, *n.* 59).

One of the small-flowering species, named in honour of its discoverer, Dr. Græffe, and in look extremely like *E. leptostachys*, Wall. List, n. 2692, from Penang; but the leaves of *E. leptostachys* (in a dried state) are not pale-green, but brown or ferruginous on the under side, the flower-buds are ovate, obtuse, and the anthers are blunt, resembling those of *E. bifidus*, Hook. and Arn. I take *E. leptostachys* to be identical with *E. ovalifolius*, Wall. List, n. 2665, from Sylhet, and, according to the original specimens at the British Museum, with *Craspedum tectorum* of Loureiro, from Cochinchina, of which *E. tectorius*, Poir., and *Dicera Craspedum*, Gmel., are synonyms.* Endlicher regarded *E. biflorus*, Hook. and Arn., as the type of a genus (*Beytheu*), the anthers of which are very different from those of the other *Elæocarpi*. If it should be kept up, either as a separate genus or a subgenus, its name will have to be suppressed in favour of *Craspedum*, the oldest of the two.

The leaves of *E. Græffei*, including petiole, are from 5–6 inches long and from 2–3 inches broad, less coriaceous than those of *E. Storckii*. Racemes longer than the petiole, but shorter than the blade of the leaf. Flower-buds ovate, acute.

* The synonymy of this plant is as follows:—*Elæocarpus tectorius*, Poir. *E. leptostachys*, Wall.! *E. ovalifolius*, Wall.! *Dicera Craspedum*, Gmel.! *Craspedum tectorium*, Lour.!—Cochinchina (Loureiro! in Mus. Brit.), Sylhet (Wallich! n. 2265), Penang (Wallich! n. 2672).

Paphia, Seem., gen. nov. *Vaccineacearum*.—*Calyx* adnatus, tubo urceolato lævi, limbo 5-partito. *Corolla* infundibuliformis, 5-costata, laciniis 5 acutis. *Stamina* 10, distincta; filamenta subulata; *antheræ* 2-loculares, muticæ, in tubos duos apice liberos productæ, antice ad apicem foraminibus dehiscentibus, basi sursum curvatæ. *Ovarium* inferum, 5-loculare, multiovulatum, disco 10-gibbo limboque calycino coronatum. *Bacca* pulposa, ovato-oblonga, lævis, 5-locularis, polysperma. —Frutex Vitiensis, 4–6-pedalis, ramis angulatis junioribus puberulis, foliis alternis ovato-ellipticis acuminatis in petiolum angustatis integerrimis v. denticulatis, pedunculis axillaribus solitariis pendulis medio bibracteatis, bracteis alternis ovato-lanceolatis ciliatis, floribus pulchris magnis (·2 unc. long.), baccis purpurascentibus.

Paphia Vitiensis, Seem. mss.—*Epigynium(?) Vitiense*, Seem. in Bonpl. ix. p.257; Viti App. p. 438.—Voma Peak, Viti Levu, 4000 feet above the sea (*Seemann !, n.* 284). Viti Levu (*Dr. Græffe !, n.* 45).

The corolla of this new and beautiful genus is somewhat like that of *Pentapterygium*, Klotzsch, but it is more decidedly funnel-shaped, and in this respect it also differs from *Epigynium*, to which I provisionally referred the plant from the fruiting specimens I collected. The fruit of *Paphia* differs from that of *Pentapterygium*, in being smooth, not 5-angular, and the anthers of my plant have at the base an appendix bent upwards. The first leaves of the growing branches are disproportionately small, linear-lanceolate, and toothed.

Vaccinium *Macgillivrayi*, Seem. n. sp.; fruticosum, erectum, ramulis foliis pedunculis bracteis calycibus baccisque pruinosis demum viridibus, ramulis angulatis, foliis obovatis v. ellipticis acutis in petiolum brevem angustatis acute serratis, pedunculis axillaribus solitariis medio bibracteatis, bracteis linearibus acutis, calycis laciniis obtusis, corolla (alba) campanulata apice paulo constricta, bacca globosa.—Island of Aneitum, New Hebrides (*Macgillivray !, in Mus. Brit.*), collected in 1854.

Differs from *V. cereum*, Forst., which it resembles in general look, in the glaucous bloom of the young parts of the plant, the shape of the leaves, the obtuse calyx-lobes, and the corolla less constricted at the mouth. Leaves thick, coriaceous, evergreen, $1\frac{1}{4}$ inch long and $\frac{3}{4}$ of an inch broad, acute, but never acuminate.

ADDITIONS TO BREWER'S 'FLORA OF SURREY.'

By Henry Trimen, Esq.

Having collected some matter supplementary to that contained in Brewer's 'Flora of Surrey,' I publish it in the hope of its being of use to botanical geographers. The additions are chiefly to the localities, though there are a few to the list of species. I have followed mainly the existing Flora in its sequence and nomenclature, and repeated nothing already published in it, either in the way of corroboration or extra quotation. I have refrained from giving any localities for those plants which are without them in the Flora (being said to grow "throughout the county," or "in all the districts"), though in some cases I am inclined to consider a species so disposed of, to be of rarer occurrence than others to which localities are affixed.

Information is particularly requested in the preface to the work, on the geological distribution of Surrey plants; the list, however, given in Appendix C (pp. 319–345) seems very complete, as far as my own observations on the matter allow me to judge of it; I have added, nevertheless, a considerable number of plants to the Wealden clay of the county, which formation seems to have had less attention paid to it, botanically, than the others. Having also had the opportunity of botanizing on the Weald of Sussex, close to the boundary of Surrey, I have noticed several plants in the former, which have not been recorded as growing on the same formation in the latter county; as the Wealden flora is of remarkable uniformity, I have mentioned some of these in their places (as found near the Surrey boundary), in the hope of calling attention to them, and leading to the probability of their discovery in Surrey.

In addition to original observations, I have looked through the third edition of Ray's 'Synopsis,' Martyn's 'Lists of Surrey Plants,' and Curtis's 'Flora Londinensis,' and extracted all their localities for the county. Many of these have found their way into the Flora through the 'Botanists' Guides,' or 'Flora Metropolitana;' those which are not entered from such sources I have supplied from the original ones. The bibliological botany of Surrey, however, is left for other hands; I have not attempted to exhaust so large a field.

The following abbreviations are used:—

R. Syn. iii. = Ray's 'Synopsis Stirpium Britannicarum' (edition 3), 1724.

M. = Appendix to Martyn's 'Plantæ Cantabrigienses' (Surrey, pp. 94–100), 1763.

Mart. = List of Surrey plants in Manning and Bray's 'History of Surrey,' by Martyn (as given in the 'Phytologist,' n. s. vol. vi. pp. 164–169).

C. or Curt. = Curtis's 'Flora Londinensis,' 1777–1798.

B. Med. Bot. = Burnett's 'Medical Botany,' 1834–1836 (has a full list of Battersea plants).

A few other works are incidentally referred to, but require no abbreviations.

I have to thank Messrs. W. T. Dyer and E. B. Penfold, for copious notes on the botany of district A; all the plants to which either of their initials are attached have been observed within the last few years. (W. T. D.) is attached to Mr. Dyer's observations, and (E. B. P.) follows those of Mr. Penfold. Where no authority follows an observation, it is to be understood as my own. The letters before each locality refer to the nine districts into which the county is divided by Mr. Brewer.

Ranunculaceæ.

Clematis Vitalba, *L.*—A. Hedge at Merton. (W. T. D.)

Thalictrum flavum, *L.*—A. Battersea Fields. (B. Med. Bot. and Fl. Metrop. p. 10.)

Anemone Apennina, *L.*—A. I saw it in Wimbledon Park abundantly in 1863. On the right-hand side of the road from Mitcham to Sutton, just inside the palings of Sir John Lubbock's place. (E. B. P.) E. Woods about Shere and Guildford. (Mart.)

Myosurus minimus, *L.*—A. Streatham, in the closes, and Wimbledon. (M. 99 and 100.) Fields near Cæsar's Camp, Wimbledon. (E. B. P.) (v. v. s.) Fields about Dulwich. (C.)

Ranunculus peltatus, *Fries.*—A. Pond between Wandsworth and Wimbledon Common.

R. floribundus, *Bab.*—A. Blacksea, Wandsworth Common.

R. Auricomus, *L.*—Common on the Wealden clay. (Capel, etc.)

R. bulbosus, *L., flore pleno.*—D. Lower side of Banstead Downs. (R. Syn. iii. 247.)

R. hirsutus, *Curt.*—A. In great plenty by the side of the wood betwixt Croydon and Mitcham. (C.) (Probably in district H, plentiful in Sussex within a mile of the Surrey border.)

R. arvensis, *L.*—H. A common pest in cornfields on the Weald; called "Hedgehogs" (I suppose from its muricated fruit) by the country people.

R. parviflorus, *L.*—A. Near Camberwell. (R. Syn. iii. 248.) Side of the road between Croydon and Mitcham. (C.) D. Banstead Downs. (Mart.)

Eranthis hyemalis, *Salisb.*—E. In Albury Park, apparently wild. (W. H. Symes, Esq.) (v. s. s.)

Aquilegia vulgaris, *L.*—A. Norwood, by the gravel-pits, near the direction-post. (M. 97.)

Papaveraceæ.

Papaver dubium, *L.*—Occurs on the Weald clay. (Capel, Ockley.)

Chelidonium majus, *L.*, var. *β.* laciniatum, *Mill.*—A. Plentifully among the ruins of the Duke of Leeds' seat, at Wimbledon, found by Mr. Martyn. (R. Syn. iii. 309.)

Fumaria muralis, *Sond.*—A. Barnes, Mr. Pamplin. (C. C. Babington, in Linn. Journ. iv. 167.)

Cruciferæ.

Coronopus didyma, *Sm.*—C. Near Chobham. (Joseph Gedge, Esq.) I have specimens from this locality, collected in September, 1861.

Isatis tinctoria, *L.*—A. Said to have been sown on railway-banks near New Wandsworth Station. (W. T. D.)

Thlaspi arvense, *L.*—I. Godalming, in the meadows on the right-hand. (M. 96.)

Teesdalia nudicaulis, Br.—A. "I found this plant, anno 1712, on the left-hand of the way going from Putney town to the bowling-green." (Dale's Herb.) Putney and Richmond Commons, Mr. Doody. (R. Syn. iii. 303.)

Lepidium campestre, *Br.*—A. In the greatest plenty about Coombe Wood. (C.) Waste ground, Wimbledon. (E. B. P.) "L. hirtum, *M.* 100.—A. Wandsworth, beyond the town, on a bank on the road to Putney," may be this or L. Smithii, *Hook.*

Armoracia rusticana, *Rupp.*—A. Fields near Wimbledon village. (W. T. D.)

Dentaria bulbifera, *L.*—On p. 18, line 1, "Warnham" should be Rusper. The plant was very fine and abundant in 1863, but did not, I think, perfect any seed.

Cardamine amara, *L.*—E. Near Darking. (R. Syn. iii. 299.)

C. hirsuta, *L.*—A. Dry places in grounds of Wimbledon House, and on Wandsworth Common. Wimbledon Churchyard. (W. T. D.)—Var. *β. sylvatica*, Link. H. Common about Ockley, Capel, and Ewhurst, on the Weald clay.

Arabis hirsuta, *Br.*—A. Garden wall of Wimbledon House.

Turritis glabra, *L.*—A. Roadside, by Cottenham Park, Wimbledon.

Nasturtium sylvestre, *Br.*—E. Roadside between Mickleham and Leatherhead.

Sisymbrium Sophia, *L.*—A. Battersea Fields. (B. Med. Bot.)

Brassica Napus, *L.*—A. Railway-bank near Clapham Junction.

Sinapis alba, *L.*—A. Amongst the corn in Battersea Fields. (C.)

S. muralis, *Br.*—A. At the back of Bedlam. (C.) S. tenuifolia, *Br.*, was confounded with this in Curtis's time. E. On the line between Gomshall and Chilworth Stations.

CISTINEÆ.

Helianthemum vulgare, *Gært.*, var. β. Surrejanum.—This Croydon plant is a monstrosity of *H. vulgare*, and not the species figured from Dickson's Garden in E. B. 2207. (Bab. Man. ed. 5, p. 37.)

VIOLACEÆ.

Viola palustris, *L.*—D. Shirley Common. (M. 96 and C.)

V. tricolor, *L.*, var. β., V. arvensis, *Murray.*—E. Shere, common. H. Abundant in the cornfields.

DROSERACEÆ.

Drosera intermedia, *Hayne.*—C. Bagshot Heath, Mr. Doody. (R. Syn. iii. 356.)

CARYOPHYLLEÆ.

Dianthus Armeria, *L.*—A. Peckham, on the top of the hill; Streatham, in the closes; in one of the closes between Dulwich and the 'Green Man.' (M. 95, 97, 99.) Top of Oak of Honour Wood. (Mart.) In the meadow this side Deptford. (Merrett.) (R. Syn. iii. 337.)

Saponaria officinalis, *L.*—A. Between London and Dulwich, by Mr. S. Harris, in 1725. (M. 95.) Coombe Wood. (Bohn's 'Pictorial Handbook of London.')—*Flore pleno.* A. Lordship Lane, by the 'Green Man,' Dulwich; Streatham, in the closes. (M. 95, 99.)

Silene Anglica, *L.*—A. Coombe Wood. (C.) B. Weybridge, in a cornfield south of the church. (M. 100.)

Sagina subulata, *Wimm.*—A. Mitcham Common. (Mart.) Putney Heath; Coombe Wood. (C.) C. Bagshot Heath, Dr. Goodenough. (C.)

S. nodosa, *Mey.*—A. Battersea, on a wall by the Thames. (M. 94.) Several places betwixt Lambeth and Putney. (Curt.)

Spergula arvensis, *L.*—Very common in cornfields, on the Weald.

Spergularia rubra, *St. Hil.*—With the last, but less abundant.

Arenaria tenuifolia. *L.*—A. Battersea. (M. 94.)

Stellaria glauca, *With.*—A. Peckham Fields, Mr. Sherard. (R. Syn. iii. 347.) Wimbledon Common. (Fl. Metrop.) Battersea Fields. (London Flora.)

Cerastium semidecandrum, *L.*, var. β. C. pumilum, *Curt.*—Near Croydon, on dry banks. (Curt. Fl. Lond.) This is the original station for the plant.

C. arvense, *L.*—D. Croydon, on Duppa's Hill. (M. 94.) About Croydon. (C.)

MALVACEÆ.

Malva moschata, *L.*—A. Very plentifully near Coombe Wood. (Curt.) Balham, by the five-mile stone on the Epsom road, upon the right-hand; (M. 94, where it is called *Malva Alcea.*)

TILIACEÆ.

Tilia intermedia, *DC.*—A. About Wimbledon, planted.

T. grandiflora, *Ehrh.*—H. At Whitstable, in Surrey (?), and near Darking; Merr. Pin. (Ray, Syn. iii. 473.)

Hypericineæ.

Hypericum Androsæmum, *L.*—A. Oak of Honour Wood, near Peckham Rye. (C.)

H. humifusum, *L.*—On the Weald. (Capel.)

H. hirsutum, *L.*—A. Oak of Honour Wood, and field beyond Dulwich College. (C.) West Barns, near Merton. (W. T. D.)

H. montanum, *L.*—D. Croydon. E. Shere. (Martyn.)

H. Elodes, *L.*—A. Shirley Common. (Mart.) C. Bagshot Heath, Mr. Doody. (R. Syn. iii. 344.)

H. calycinum, *L.*—C. Well naturalized between Chertsey and Chobham, and near Windlesham. (Phytol. n. s. 1860, p. 338.)

Geraniaceæ

Erodium cicutarium, *Sm.*—H. Occurs on the Weald clay.

E. moschatum, *Sm.*—A. Near Battersea, Mr. Fisher. (R. Syn. iii. 358.)

Geranium pratense, *L.*—A. About Battersea and by the way from Richmond to Kingston. (R. Syn. iii. 360, and M. 95, 96.) Abundant in the meadows about Battersea. (C.) Near the Thames, about Mortlake and Kew. (W. T. D.)

G. Pyrenaicum, *L.*—A. Railway cutting at Wandsworth and Wimbledon churchyard, plentiful.

Impatiens Noli-me-tangere, *L.*—A. A patch of this plant in Battersea Fields, two or three years back. (C. Berrell, Esq.)

Celastrineæ.

Euonymus Europæus. *L.*—A. Between London and Dulwich, S. Harris, 1725. (M. 95.) Found on the Weald clay commonly. About Capel, etc.

Rhamneæ.

Rhamnus Frangula, *L.*—A. Between London and Dulwich, S. Harris, 1725. (M. 95.) Norwood. (M. 97.) Wimbledon Common, plentiful. (W. T. D.) E. Marked for this district, I think, near Albury.

Leguminosæ.

Spartium Scoparium, *L.*—Occurs on the Weald clay, but not commonly. (Capel.)

Ulex nanus, *Forst.*—E. About Shere, Albury, etc. *U. Gallii*, Planch., is the common plant, but I have seen the true *nanus* on Hurtwood Common.

Genista Anglica, *L.*—A. Mitcham and Norwood Commons. (M. 97.) Wimbledon Common. (W. T. D.) D. Croydon, on the common. (M. 94.)

Ononis campestris, *Koch.*—H. By the roadside, near Ockley.

Melilotus vulgaris, *Willd.*—A. Railway embankment near Wimbledon Station. (W. T. D.)

Trifolium subterraneum, *L.*—A. On Richmond Common, very plentifully, Dr. Robinson. (R. Syn. iii. 327.) Stockwell and Streatham Common. (M. 98.)

T. arvense, *L.*—A. Between London and Dulwich, by Mr. S. Harris, 1725. (M. 95.)

T. minus, *Relh.*—Found on Weald clay. (Ockley and Capel.)

T. filiforme, *L.*—A. Damp sandy places about Putney. (Ray, Syn. iii. 331, and tab. xiv. fig. 4.)

[Glycyrrhiza officinalis.—I. Godalming. (M. 96.) An escape from cultivation.]

Ornithopus perpusillus, *L.*—A. Mitcham and Streatham Commons and Norwood. (M. 98.) H. Blackheath, near Chilworth.

Vicia sativa, *L.*, var. β. angustifolia, *R.*—A. Wandsworth Common; near Wimbledon. E. Noted for this district; somewhere near Albury.

V. tetrasperma. *Koch.*—A. Not "Wimbledon Common," but in a hedge near the railway station.

Lathyrus Nissolia, *L.*—A. In a close by the footway from Dulwich Green to the wells. (R. Syn. iii. 325.) Dulwich; Peckham, on the hill by the wood; Stockwell; Streatham, and between it and Mitcham. (M. 95, 97, 98, 99.) E. South slope of Box Hill, amongst the bushes.

L. palustris, *L.*—A. Peckham Fields, in a squalid watery place, T. Willisel. (R. Syn. iii. 320.)

L. sylvestris, *L.*—A. Between Oak of Honour Hill and Peckham, Mr. Rand and Mr. Doody; by Coombe Park gate, going to Mitcham, Mr. Dubois. (R. Syn. iii. 319.) Wimbledon, near the great pond. (M. 100.)

Rosaceæ.

Prunus spinosa, *L.*, var. β. insititia, *L.*—H. Hedges, Capel, on the Weald clay.

P. Cerasus, *L.*—A. Wimbledon, in the park. (M. 100.)

P. avium, *L.*—A. Hedge, Wandsworth. E. Denbies, by Dorking.

Spiræa Filipendula, *L.*—A. Clapham. (M. 94.) Wimbledon Common. (Bohn's 'Illustrated Handbook of London.')

Potentilla Tormentilla, *Schk.*—Not uncommon on the Weald. Holmwood, Ockley.—Var. β. *nemoralis*, Nestl. H. Near Capel.

Comarum palustre, *L.*—E. Guildford, in the meadows. (M. 96.)

Rubus* Idæus, *L.*—A. Wimbledon Common. (H. T.)—Var. β. *trifoliatus*, Bell-Salt. B. Esher.

R. suberectus. *And.*—A. Wimbledon Common.

R. nitidus, *W. and N.*—H. Woods, Dorking.

R. rhamnifolius, *W. and N.*—A. Wimbledon. C. Bagshot. H. Dorking.

R. leucostachys, *Sm.*—B. Esher. H. Dorking.—Var. β. *vestitus*, Bell-Salt. A. Woods, Wimbledon. H. Woods, Dorking.—Var. γ. *argenteus*, Bell-Salt. A. Mortlake.

R. carpinifolius, *W. and N.*—A. Wimbledon Common.

R. Radula, *Weihe.*—C. Hedge near Egham.

R. rudis, *Weihe.*—A. Wimbledon Common.

R. Kœhleri, *Weihe*, var. ε. fuscus, *Bab.*—B. Near Esher.

R. hirtus, *W. and N.*—A. Roadside between Wandsworth and Wimbledon Common.

R. rosaceus, *Weihe.*—A. Wimbledon Common.

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* The localities for *Rubi* are chiefly taken from a paper by Thos. Meehan, in Phytol. o. s. vol. iii. p. 9. They were observed in 1846–7.

R. corylifolius, *Sm.*—A. Merton. (W. T. D.)
Rosa spinosissima, *L.*—A. Waddon Marsh. (M. 99.)
Rosa villosa, *L.*—A. Probably a form of this, which Dillenius says grows a little on this side Kingston, by the Thames. (R. Syn. iii. 478.)
Rosa rubiginosa, *L.*—A. Norwood Common. (M. 97.) Barnes Common. (Al. Irvine.) G. and H. Holmwood Common.
Alchemilla arvensis, *Lam.*—Cornfields on the Weald clay, common.
Pyrus Aucuparia, *Gært.*—A. Norwood. (M. 97.)

Onagrarieæ.

Epilobium angustifolium, *L.*—A. Wimbledon. (M. 100.) E. and H. Abundant on either bank of the railway from Dorking to Gomshall.
E. roseum, *Schreb.*—A. Wimbledon. (E. B. P.)
E. palustre, *L.*—A. Barnes Common. (W. T. D.)
E. tetragonum, *L.*—A. Wimbledon. (E. B. P.) Battersea. (B. Med. Bot.) —Var. *β. obscurum*, Schreb. H. Shalford Common, with *E. palustre.*

Hippurideæ.

Hippuris vulgaris, *L.*—A. Battersea. (B. Med. Bot.)

Myriophylleæ.

Myriophyllum verticillatum, *L.*—A. Wimbledon. (W. T. D.)
M. spicatum, *L.*—A. Streatham, about the pits. (M. 98.) Blacksea, Wandsworth Common.

Callitrichineæ.

Callitriche platycarpa, *Kütz.*, var. *β.* stagnalis, *Scop.* (Bab. Man. v. 294.)—A. By Sir Hans Sloane, on Wimbledon Common. Putney Heath. (R. Syn. iii. 289.)—'*C. verna*, *β.*' Between London and Dulwich, Mr. S. Harris, 1725. (M. 95), may be this plant.
C. hamulata, *Kütz.*, var. *β.* pedunculata, *De Cand.*—H. Round the pond on Shalford Common, where *Cyperus fuscus* grows.

Portulaceæ.

Montia fontana, *L.*—On the Weald. (H. Holmwood Common.)

Scleranthieæ.

Scleranthus annuus, *L.*—Is also found on the Wealden clay. (H. Cornfields at Capel.)

Grossularieæ.

Ribes rubrum, *L.*—To this species Hudson and Smith refer the *Ribes fructu parvo*, found plentifully in Wimbledon Park, by Mr. J. Sherard. (R. Syn. iii. 456.)

Crassulaceæ.

Sedum reflexum, *L.*—A. Battersea Fields. (B. Med. Bot.)

Saxifragaceæ.

Saxifraga granulata, *L.*—A. Near Mitcham, Mr. Dubois (R. Syn. iii. 354),

and *flore pleno* (M. 96.) Waddon Marsh and Wandsworth. (M. 99.) Wimbledon Park, with *Anemone apennina*. Meadows, by the Thames, opposite Twickenham.

Chrysosplenium oppositifolium, *L.*—G. By the Mole, near Betchworth.

Adoxa moschatellina, *L.*—Occurs on the Weald clay in Sussex, and would be probably found on that of Surrey.

Umbelliferæ.

Cicuta virosa, *L.*—A. Battersea. (M. 94.)

Conium maculatum, *L.*—A. Battersea Fields. (B. Med. Bot.) E. Roadside, between Mickleham and Leatherhead.

Smyrnium Olusatrum, *L.*—A. Vauxhall. (M. 99.)

Helosciadium nodiflorum, *Koch*, var. *β.* repens, *Koch.*—A. Battersea Fields. (B. Med. Bot.)

H. inundatum, *Koch.*—A. Streatham, in and about the pits. (M. 98.) Wimbledon Common.

Sison Amomum, *L.*—A. Back of Christ Church, Wimbledon, and elsewhere (E. B. P.)

Ægopodium Podagraria, *L.*—A. Battersea Fields. (B. Med. Bot.) Wimbledon Churchyard. (W. T. D.) Near Wimbledon Railway-station.

Bunium flexuosum, *L.*—This belongs to the Weald clay flora. (G. Capel, etc.)

Pimpinella magna, *L.*—I. Godalming. (Mart.)

Sium latifolium, *L.*—A. In the ditches between Rotherhithe and Deptford, Mr. Doody. (R. Syn. iii. 210.)

Bupleurum tenuissimum, *L.*—I. Godalming. (Mart.)

B. rotundifolium, *L.*—As this occurs rather commonly in Warnham and Rusper parishes, Sussex, in cornfields on the Weald, it may be expected on the same formation in Surrey.

Œnanthe Phellandrium *Lam.*—A. Barnes Common. (W. T. D.)

Fœniculum vulgare, *Gært.*—A. Cottenham Park, near Wimbledon. (E. B. P.)

Silaus pratensis, *Besser.*—A. Merton. (W. T. D.)

Pastinaca sativa, *L.*—A. Merton. (W. T. D.)

Torilis infesta, *L.*—H. Cornfields about Capel and elsewhere, on the Weald clay.

Loranthaceæ.

Viscum album, *L.*—A. Grounds of Wimbledon House. (E. B. P.) Richmond Park. (Mr. Toynbee.)

Rubiaceæ.

Galium cruciatum, *L.*—This is found on the Weald. (G. Capel, etc.)

G. Anglicum, *Huds.*—D. Duppa's Hill, Croydon. (Mart.)

G. tricorne, *With.*—Found on the Weald of Sussex close to Surrey, with *Bupleurum rotundifolium*.

Sherardia arvensis, *L.*—Cornfields on the Weald clay. (G. Capel.)

Asperula odorata, *L.*—H. Common on the Weald.

Valerianeæ.

Centranthus ruber, *De Cand.*—A. Between Dulwich and Clapham. (Mart.)

Dipsacaceæ.

Dipsacus pilosus, *L.*—E. Guildford. (Mart.)

Scabiosa succisa, *L.*—H. A variety with pink flowers, near Ockley.

Compositæ.

Tragopogon pratensis, *L.*—A. Streatham in the closes. (M. 99.)—Var. β. *T. minor, Fries.* A. I refer to this, a plant abundant in some newly-made roads, near Battersea Park.

Helminthia echioides, *Gært.*—A. Battersea Fields. (B. Med. Bot.) Wimbledon Common. (W. T. D.) H. Common by fields and roadsides on the Weald in this district.

Picris hieracioides, *L.*—H. Hurtwood, on the Upper Greensand. A slender form, with narrow leaves.

Thrincia hirta, *Roth.*—A. Barnes Common. (C.)

Hypochæris glabra, *L.*—A. In the fields between Kingston and Richmond, Mr. Doody. (R. Syn. iii. 166.)

Lactuca muralis, *Less.*—D. Road from Croydon to Sanderstead. (Mart.)

Hieracium murorum, *L.*—A. Norwood. (M. 97.) H. Hurtwood.

H. vulgatum, *Fries.*—A. Putney Heath. (W. T. D.) E. Albury.

H. boreale, *Fries.*—A. Between London and Dulwich, Mr. S. Harris, 1725. (M. 95.)

Taraxacum officinale, *Wigg*, var. δ. palustre, *De Cand.*—A. Mitcham Common. (Mart.) Wimbledon Common. (E. B. P.)

Arnoseris pusilla, *Gært.*—A. Petersham, in a sandpit on the right-hand, going to the Duke of Argyle's. (M. 98.)

Cichorium Intybus, *L.*—A. Merton. (W. T. D.)

Serratula tinctoria, *L.*—A. Between London and Dulwich, Mr. S. Harris, 1725. (M. 95.)

Carduus nutans, *L.*—A. Thames bank, opposite Twickenham.

C. acanthoides, *L.*—A. Merton; lane between Mortlake and Kew. (W. T. D.)

C. Marianus, *L.*—Var. with green leaves, near Kennington turnpike. (C.)

C. arvensis, *L.*, β. setosus, *Bab.*—A. In the corn in Battersea Fields. (R. Syn. iii. 198.) Still grows in what was once Battersea Fields. (Phytol. n. s. 1862, p. 172.)

C. pratensis, *Huds.*—D. Croydon Common. (Mart.)

C. heterophyllus, L.—D. On a moor, two miles east of Croydon. Merr. Pinax. (R. Syn. iii. 193.)

C. acaulis, *L.*—E. At Denbies, near Dorking. With a stem.

Galinsoga parviflora, *Cav.*—A. Abundantly naturalized near Kew, East Sheen, and Richmond. (Journ. of Bot. i. 104.)

Bidens cernua, *L.*—E. Abounds about Albury, Shere, Gomshall, and Chilworth.

B. tripartita, *L.*—In Surrey, near to Somerset Bridge, in the fish-pond upon the moor. (R. Syn. iii. 188, t. vii. fig. 2.) A starved form.

Artemisia Absinthium, *L.*—A. Battersea Fields. (B. Med. Bot.)

Gnaphalium dioicum, *L.*—D. Banstead Downs. (Mart.)

G. uliginosum, L.—H. A plant of the Wealden clay formation.
Petasites vulgaris, *Desf.*—A. Abundant on the side of the Thames between Putney and Hammersmith Bridges. (W. T. D.)
Senecio erucæfolius, *L.*—A. Oak of Honour Wood. (C.)
Anthemis nobilis, *L.*—A. Between London and Dulwich, S. Harris, 1725. (M. 95.) Mitcham and Barnes Commons. (W. T. D.) H. Ockley Common.
A. arvensis, *L.*—A. In the gravel-pits in Peckham Fields. (R. Syn. iii. 185.)

Campanulaceæ.

Campanula rotundifolia, *L.*—Grows on the Weald. (H. Ockley and Capel.)
C. patula, L.—B. Cobham. (Martyn.)

Ericaceæ.

Calluna vulgaris, *L.*—Sparingly on the Weald clay. (H. Near Ockley.)—Var. *β. tomentosa.* C. and G. Over the whole of Bagshot Heath and Red Hill, Mr. Doody (who considered it a distinct species). (R. Syn. iii. 471.) H. Hurtwood. A densely woolly form.
Vaccinium Myrtillus, *L.*—A. Coombe Wood. (E. B. P.) E. Shere and Albury. (Mart.) H. Ewhurst and Cranley. (Mart.) On the Weald on Holmwood Common.
Monotropa Hypopitys, *L.*—E. Beneath Beeches, halfway up the Downs, behind Shere, towards the Netherlands Farm.

Oleaceæ.

Ligustrum vulgare, *L.*—A. Wimbledon. (E. B. P.) H. Hedges on the Weald, common.

Apocyneæ.

Vinca minor, *L.*—A. Wandsworth. (Mart.) Lordship Lane, Dulwich, apparently wild. (C.) B. Cobham. (Mart.) D. Croydon. (Mart.)
V. major, *L.*—A. Under Lord Stormont's Park pales, betwixt Wandsworth and Putney Common, where it was certainly in a perfectly wild state (?). (C.) Dulwich and Battersea. (M. 94 and 95.)

Gentianeæ.

Gentiana Pneumonanthe, *L.*—C. Between Chobham and Chertsey. (Phytol. n. s. 1860, p. 335.) I have specimens from this locality collected in 1861.
Menyanthes trifoliata, *L.*—A. Battersea Fields. (Curt.)

Solaneæ.

Atropa Belladonna, *L.*—E. West Clandon. (Mart.)

Scrophularineæ.

Veronica Anagallis, *L.*—A. Wandsworth and Merton. (W. T. D.) E. or H. Near Gomshall.
Bartsia Odontites, *Huds.*—A. Wimbledon. (E. B. P.)
Pedicularis palustris, *L.*—Occurs on Weald clay on Holmwood Common.

P. sylvatica, *L.*—Found on Weald clay. (G. Capel, in small woods.)
Antirrhinum majus, *L.*—A. Walls at Wimbledon and Roehampton. (W. T. D.)
Linaria Cymbalaria, *Mill.*—A. Walls at Wimbledon in several places. (W. T. D.) Sides of the stream running under Vauxhall turnpike. (C.)
L. spuria, *Mill.*—A. In a cornfield between Beckenham and Shirley Common. (C.) H. Not uncommon in cornfields on the Weald clay.
L. Elatine, *Mill.*—A. Between London and Dulwich, Mr. S. Harris. (M. 95.) Coomb Wood. (C.) H. With the last, and more plentiful than it in the Weald cornfields.
Linaria minor, *Desf.*—A. Battersea Fields. (C.) H. Capel, Ockley, and elsewhere, on the Weald clay.
L. vulgaris, *Mill.*—The *Peloria* form has been found (A.) at Camberwell and Clapham, in sandy meadows. (M. 94.)
Limosella aquatica, *L.*—D. Croydon. (Mart.)
Orobanche major. *Angl.* = O. Rapum, *Thuill.* (Bab. Man. v. p. 235.) A. Norwood Common. (Mart.) Abundant in a small hilly field about half a mile beyond the Robin Hood turnpike, two miles from Kingston. (C.) B. Between Epsom and Leatherhead. (M. 96.)

Verbenaceæ.

Verbena officinalis, *L.*—A. Wimbledon. (E. B. P.)

Labiatæ.

Salvia Verbenaca, *L.*—A. Morden. (Mart.) E. Effingham and Great Bookham. (Mart.)
Mentha aquatica, *L.*—A. Wimbledon, near Sir Theodore Janssen's. (M. 100.)
M. sativa, *L.*—A. In Peckham Fields. (R. Syn. iii. 232.)
M. Pulegium, *L.*—A. Streatham, in and about the pits. (M. 99.)
Calamintha Acinos, *Clairv.*—H. On a wall near Abinger.
Melissa officinalis, *L.*—A. Clapham, on the Common, by a ditch-side. (M. 94.)
Lamium amplexicaule, *L.*—E. About Shere and elsewhere.
Galeopsis Ladanum, *L.*—H. Cornfields on the Weald clay about Capel.
Stachys palustris, *L.*—A. Wimbledon Common, west side towards Coombe Wood. (W. T. D.)
Stachys arvensis, *L.*—A. Cornfields about Oak of Honour and Coombe Wood. (C.) Cornfields at Wimbledon. (E. B. P.) H. Occurs on the Weald.
Nepeta cataria, *L.*—A. Streatham Common. (M. 98.)
Marrubium vulgare, *L.*—A. Streatham Common. (M. 98.)
Prunella vulgaris, *L.*, form with white flowers, but not *P. alba*. (Pall.)—A. Between Wandsworth and Wimbledon.
Scutellaria minor, *L.*—A. Streatham Common. (M. 99.) Putney Common. (C.) Wimbledon Common. (W. T. D.) D. Shirley Common. (C.)

Boragineæ.

Myosotis repens, *Don.*—A. On Wimbledon Common. (E. B. P.) (v. v. s.)

Myosotis sylvatica, *Ehrh.*—This occurs in Warnham parish, Sussex, and is likely to be found on the Weald of Surrey.

Lithospermum arvense, *L.*—A. Battersea Fields. (B. Med. Bot.)

Symphytum tuberosum, *L.*—A. With *Eranthis* and other doubtful natives in some plenty in Wimbledon Park. Collected in 1863.

Anchusa sempervirens, *L.*—A. Vauxhall. (M. 99.)

Cynoglossum officinale, *L.*—A. Richmond Park. (Phytol. n. s. 1862, p. 288.)

Pulmonaria officinalis, *L.*—D. In a wood between Croydon and Godstone.

PRIMULACEÆ.

Primula vulgaris, *Huds.*, var. β. elatior, *Ang. Plur.*—H. On the Weald clay of this district and the adjoining part of Sussex; a complete series of plants connecting *P. veris* and *vulgaris* may be gathered in any hedge-row, but I have never seen there Jacquin's *P. elatior.*

Hottonia palustris, *L.*—A. Between Kent Street Road and Peckham. (C.) In the ponds of Wimbledon House grounds, abundant, probably planted, though the gardener says that the plant has been there longer than he remembers. E.? I have seen a specimen gathered near Albury.

Anagallis arvensis, *L.*, var. β. cærulea. *Aut.*— A. Peckham. (M. 97.) Between Streatham and Mitcham. (M. 99.)

Anagallis tenella, *L.*—D. Shirley Common, most abundantly. (C.)

Centunculus minimus, *L.*—D. Croydon. (Mart.)

Samolus Valerandi, *L.*—A. In the road leading frem New Cross turnpike to the Island of St. Helena, Rotherhithe, plentifully. (C.)

CHENOPODIACEÆ.

Chenopodium polyspermum, *L.*—Occurs abundantly in Sussex, on the Weald, about one mile from the Surrey boundary.

C. hybridum, *L.*—A. Norwood. (Mart.)

Atriplex erecta, *Huds.*—H. Common in cornfields on the Weald clay.

A. deltoidea, *Bab.*—Probably common in the county. I have seen it near Battersea and on the Weald clay in Sussex.

POLYGONEÆ.

Polygonum lapathifolium, *L.*, var. β, P. laxum, *E. B. S.*—*P. Pennsylvanicum*, Curt. Fl. Lond., seems to be this. A. Peckham Rye and St. George's Fields. (C.)

P. minus, *Huds.*—H. Shalford Common.

P. dumetorum, *L.*—H. Abundantly on a thick hedge in Shere parish, 1863.

Rumex Hydrolapathum, *L.*—E. In the Tillingbourne, especially round Albury Ponds.

R. sanguineus, *L.*, var. β, R. viridis, *Sibth.*—A. Camberwell Grove. (C.)

R. pulcher, *L.*—A. All over St. George's Fields, in Southwark. (R. Syn. iii. 142.)

R. maritimus, *L.*, var. β, R. palustris, *Sm.*—A. St. George's Fields. (Curt. Fl. Lond., where there is a good figure of the plant.)

Thymeleæ.

Daphne Laureola, *L.*—A. Streatham, in the closes. (M. 99.)

Euphorbiaceæ.

Euphorbia exigua, *L.*—Common on the Weald clay in cornfields. (H. Ockley and Capel.)

E. amygdaloides, *L.*—A. Norwood and Streatham. (M. 97 and 99.) Wimbledon. (W. T. D.)

Parietaria officinalis, *L.*—A. Wimbledon churchyard. (W. T. D.)

Cannabineæ.

Humulus Lupulus, *L.*—A. Wimbledon and Mortlake. (W. T. D.) E. Denbies, by Dorking.

Amentaceæ.

Carpinus Betulus, *L.*—Hedges on the Sussex Weald, but not common; probably occurs on the same formation in Surrey.

Salicineæ.

Salix alba, *L.*—A. Wimbledon. (W. T. D.) H. Hedges round Capel; often grows to a large size on the Weald.

S. viminalis, *L.*—A. Wimbledon. (W. T. D.)

S. repens, *L.*, "var. *β.*"—D. In a wood by West Wickham and Addington. (R. Syn. iii. 448.)

S. aurita, *L.*—A. Norwood, near Streatham, Mr. Stonestreet. (R. Syn. iii. 450.)

Orchideæ.

Spiranthes autumnalis, *Rich.*—I. In damp places near the stream at Dunsfold, Dr. Richardson. (R. Syn. iii. 378.)

Epipactis media, *Fries.*—E. In a wood on the Downs above Shere.

Orchis mascula, *L.*—A. Battersea Fields. (B. Med. Bot.)

O. latifolia, *L.*—Probably some or all of the stations given in the 'Flora belong to *O. incarnata*, L., which Curtis figured for *O. latifolia*. (See Bab. Man. v. 319.) *O. incarnata* certainly occurs on (A.) Wimbledon Common, from which locality I received fresh specimens from Mr. Penfold in 1862.

Habenaria bifolia, *Br.*—A. Norwood; Norwood Common; Pens Common, near Beckenham. (M. 98.)—Var. *β*, *H. chlorantha*, Bab. H. Not uncommon in the clayey woods about Capel.

H. viridis, *Br.*—D. Banstead Downs. (Martyn.)

Aceras anthropophora, *Br.*—E. Chalk-pits about Leatherhead. (C.)

Liliaceæ.

Tulipa sylvestris, *L.*—A. In the triangular field at the junction of the Kingston and Merton roads. (W. Pamplin.)

Allium ursinum, *L.*—A plant of the Weald clay in Sussex.

Gagea lutea, *Ker.*—I. Godalming, in the meadows. (M. 96.)
Ornithogalum umbellatum, *L.*—A. Streatham, in the closes. (M. 99.) On a small island in the Thames at Teddington.
Scilla autumnalis, *L.*—A. Sparingly on Kew Green. (C.) Mouldsworth. (Moulsey?) (M. 97.) B. Near Ditton and on Kingston Bridge. Merr. Pinax. (R. Syn. iii. 373.)

SMILACEÆ.

Ruscus aculeatus, *L.*—H. Under the furze on Holmwood Common on the Weald clay.
Convallaria majalis, *L.*—H. On the Hurtwood. (W. H. Symes, Esq.)
Paris quadrifolia, *L.*—E. or H. Near Albury. (v. v. s.)

HYDROCHARIDEÆ.

Anacharis Alsinastrum, *Bab.*—A. Blacksea, Wandsworth Common; in the stream not far from Barnes Station, abundant.
Stratiotes aloides, *L.*—A. The plants on Wandsworth Common were planted there by Mr. Anderson, a former curator of Chelsea Gardens. (W. T. D.) Thames side. (Mart.) Clapham and Walworth. (C.)

BUTOMEÆ.

Alisma Plantago, *L.*, var. β, A. lanceolata, *With.*—A. Barnes.
A. ranunculoides, *L.*—H. Probably occurs in this district. Found in Sussex close to the boundary.
Actinocarpus Damasonium, *Br.*—A. In Larymer's Pond, on the left-hand of Newington Butts. (R. Syn. iii. 273.) Clapham and Walworth. (C.)
Butomus umbellatus, *L.*—A. Island of St. Helena, near Deptford Marshes. (C.) D. Croydon. (Mart.)

NAIADEÆ.

Potamogeton crispus, *L.*—A. Streatham, in and about the pits. (M. 98.)—Var. *P. serratus*, Huds. The form with the margins of the leaves not crisped. A. Ditches in St. George's Fields. (R. Syn. iii. 148.)
Acorus calamus, *L.*—E. About Hedley, by Dr. Brown, of Magdalen Coll., Oxford. (R. Syn. iii. 437.)

JUNCACEÆ.

Juncus lamprocarpus, *Ehrh.*—E. Near Albury.
Luzula sylvatica, *Ehrh.*—H. Marked for this district, I think on the Weald.
L. Fosteri, *DC.*—Is found on the Weald in Sussex, close to Surrey.
L. multiflora, *Lej.*—A. Battersea Fields. (Mart.) Ravine on Wimbledon Common. (W. T. D.) (v. v. s.)

CYPERACEÆ.

Rhynchospora alba, *Vahl.*—D. Bog between Wickham and Croydon. (R. Syn. iii. 427.)
Blysmus compressus, *Panz.*—A. In the rill near Dulwich wells, Mr. Doody. (R. Syn. iii. 425.) D. Shirley Common. (Mart.)

Scirpus carinatus, *Sm.*—A. On this side Battersea meadows, Doody. (R. Syn. iii. 428.)

S. setaceus, *L.*—A. Norwood. (M. 97.)

S. maritimus, *L.*, var. β (Smith, Eng. Flora, i. 61),=S. tuberosus, *Desf.*—A. By the Thames about London in many places, Mr. Doody. (R. Syn. iii. 426.) Riverside between Putney and Hammersmith Bridges, abundantly. (W. T. D.) This plant is the same as that found on the Essex coast and in South Kent by the Rev. G. E. Smith; it differs from the usual form of *S. maritimus* by its roots having round knobs, and its spikelets being fewer, more clustered, narrower, and on shorter peduncles or quite sessile. (Miller's Dict. by Martyn.) This, as far as I can see, exactly agrees with my plant. (W. T. Dyer.) The Battersea plant (Brewer's Flora, p. 258) is the ordinary form of *S. maritimus*, like that of Hampshire and the Isle of Wight. It also occurs in Isle of Dogs (Mart.), and elsewhere by the Thames. (Fl. Metrop. Supp. 7.) Curtis says it is found in the river Thames in many places where the water is not salt, and by the creeks from it.

S. cæspitosus, *L.*—A. Streatham, with the next. (M. 99.)

S. fluitans, *L.*—A. Streatham, in a pit about a hundred paces above the Hill House. (M. 99.)

Eriophorum vaginatum, *L.*—C. or F. Heaths near Woking. (Mart.) D. On the great bog beyond Joan Cole's, towards Croyden, in great plenty, Mr. J. Sherard. (R. Syn. iii. 436.) Shirley Common. (Curt.)

E. angustifolium, *Roth*, var. ε. polystachion, *L.*—A. Battersea. (Curt.)

Carex dioica, *L.*, C. capitata, *Huds. Fl. Anglica*, ii. 402.—D. Shirley Common, near Croydon. (M. 98.)

C. pulicaris, *L.*—D. Shirley Common. (M. 98.)

C. muricata, *L.*—A. Wandsworth Common.

C. divulsa, *Good.*—A. Side of lowest pond, Wimbledon House grounds. (W. T. D.) H. Hedges on the Weald, common.

C. acuta, *L.*—A. Battersea. (Curt.)

C. pendula, *Huds.*—H. Common on the Weald, in woods and hedges.

C. vesicaria, *L.*—A. Battersea Fields. (B. Med. Bot.)

C. riparia, *Curt.*—A. Side of pond, grounds of Wimbledon House.

Gramineæ.

Setaria viridis, *Beauv.*—E. About Martha's Chapel. (Huds. Fl. Anglica, ii. 24.)

S. verticillata, *Beauv.*—A. In a field, among Turnips, beyond Putney, by the way thence to Rough-Hampton. (R. Syn. iii. 394.)

Milium effusum, *L.*—A. Plantation in grounds of Wimbledon House. (W. T. D.)

Apera Spica-venti, *Beauv.*—D. Croydon. (Martyn.)

Agrostis setacea, *Curt.*—C. The only Grass in some parts of Bagshot Heath as near Chobham. (Phytol. n.s. 1860, p. 337.) Surely Curtis's station for a plant he was the first to distinguish needs no confirmation. On the great heath-lands of West Hants. and Dorset it grows in vast quantities, to the exclusion of every other Grass but *Molinia cærulea*. It is also abundant in parts of the Isle of Wight.

Phragmites communis, *Fries.*—A. Mitcham. (W. T. D.)
Avena pubescens, *L.*—D. Banstead Downs. (M. 94.)
Melica uniflora, *Kütz.*—H. Ockley and Capel, on the Weald.
Glyceria aquatica, *Sm.*—E. Shere, Albury, and Gomshall.
Glyceria plicata, *Fries.*—A. Wimbledon Common, near the village.
Poa bulbosa, *L.* (?).—A. Clapham. (M. 94.) What plant is intended?
Festuca elatior, *L.*—A. Between Battersea and Vauxhall, and nearly opposite the Physic Garden, Chelsea. (Curt.)
F. pratensis, *Huds.*, var. β, F. loliacea, *Huds.*—A. Vauxhall. (M. 99.) Battersea Fields. (B. Med. Bot.)
Bromus giganteus, *L.*—A. Sides of the Thames. (C.) Between Wandsworth and Wimbledon Common.
Triticum caninum, *Huds.*—D. Round Croydon, Mr. Doody. (R. Syn. iii. 390.)
Lolium Italicum, *Braun.*—Largely grown on the Weald farms.
Hordeum murinum.—Occurs on the Weald clay.

Filices.

Ceterach officinarum, *Willd.*—A. East Sheen. (Mart.)
Polystichum aculeatum, *Roth.*—G. Hedgebanks about Capel, common.
Lastrea Oreopteris, *Presl.*—A. Wimbledon Common. (E. B. P.)This has been gradually extirpated and did not appear in 1863. "I had a frond from the last root in 1862." (W. T. D.)
L. dilatata, *Presl.*—A. Cæsar's Camp, Wimbledon. (E. B. P.) Barnes Common. (W. T. D.) In the plantations of Wimbledon House grounds. H. Near Ewhurst.
Athyrium Filix-fœmina, *Roth.*—A. In two places near the Warren Farm, Wimbledon. (E. B. P.) Bottom of Wimbledon Common, near Coombe Wood. (W. T. D.)
Asplenium Trichomanes, *L.*—A. East Sheen. (Mart.)
A. Adiantum-nigrum, *L.*—A. On an old wall near the railway station, Wimbledon. (E. B. P.)
A. Ruta-muraria, *L.*—A. With the last. (E. B. P.) H. Cranley. (Mr. Cole).
Scolopendrium vulgare, *Syme.*—A. Wimbledon churchyard, in several places, and old wall at Ham House. (E. B. P.)
Blechnum boreale, *Sw.*—A. Norwood. (M. 97.)
Osmunda regalis, *L.*— A. Ravine on Wimbledon Common. Now destroyed in that station, a man having taken what is believed to have been the last root about four years ago. (E. B. P.) B. Weybridge, by the side of a coppice. (M. 100.) C. On Bagshot Heath. (R. Syn. iii. 125.)
Ophioglossum vulgatum, *L.*—A. Field near Coombe Wood and elsewhere about Wimbledon. H. Occurs about a mile from the Surrey border in Sussex, on the Weald.

Lycopodiaceæ.

Lycopodium clavatum, *L.*—D. Shirley Common. (Martyn.)
L. annotinum, *L.*—I. On heaths between Godalming and Wakehurst, in Sussex, D. Manningham. (R. Syn. iii. 107.) Some error in the name or locality.

L. Selago, *L.*—D. Shirley Common. (Mart.)
L. inundatum, *L.*—A. In small quantity on Wimbledon Common in 1863. Shown me by Mr. Penfold. C. Bagshot Heath. (R. Syn. iii. 108.)
Pilularia globulifera, *L.*—Streatham, "prope fontes medicatos." (R. Syn. iii. 136.) In a pit on the left-hand, about a hundred paces above the Hill House. (M. 99.)

EQUISETACEÆ.

Equisetum Telmateja, *Ehrh.*, E. arvense, *L.*—H. Are both common on the Weald clay.

For some additions to the lists of introduced plants in the Flora (Appendices A and B), see papers by Mr. Britten in 'Journal of Botany,' Vol. I. p. 375, and the 'Botanists' Chronicle,' 1864, p. 20. I gathered *Impatiens parviflora* on a bank at Mickleham in 1861, and *Medicago parvifiora* in cornfields at Merton.

CORRESPONDENCE.

The Law of Priority in Nomenclature.

Cambridge, January 6, 1864.

No person can read the valuable text of the new edition of 'English Botany' without seeing that Mr. Syme has ideas about nomenclature not altogether in accordance with the rules followed by most botanists. As in general these ideas do not infringe very greatly or injuriously upon law, no formal objection has been raised to them. But in the recently published No. 13 there is an instance of departure from legal usage of a serious kind; and it is defended in a footnote by laying down a rule which is contrary to former decisions. If this new law were accepted many of the recognized generic names would probably have to be altered, and thus much confusion would be introduced into botanical nomenclature. The case in question will be found in page 128 of volume ii., where *Spergularia* (Pers.) is adopted as the name of the genus *Lepigonum* of Fries; and the note in defence of this act—"The name *Lepigonum* is inadmissible, as *Spergularia* was clearly characterized by Persoon as a section of *Arenaria* at an earlier date." Here we have a definite statement of Mr. Syme's reason for adopting *Spergularia* as of Persoon, and as a generic name.

It is true that some excellent botanists have used the same nomenclature as Mr. Syme; but they, in most cases, tacitly express their belief of *Spergularia* possessing the claim of priority, *as used generically*, over *Lepigonum*. De Candolle lays down a definite law to regulate such cases. He says ('Théorie Elémentaire,' p. 266) that when we divide a genus, the portions of it which do not continue to bear the old name ought, if the groups were considered as genera by the ancient botanists, to retain their ancient names; thus *Poly-*

gonum is divided into *Bistorta*, *Persicaria*, and *Fagopyrum*, all known to the ante-Linnæan botanists; but if the groups have not been considered as genera the ordinary laws for forming generic names come into action, and the sectional name may or may not be neglected by the first describer of the section as a genus.

As far as I can discover, this is the only law that has been formally laid down by competent authority; but the practice of the best authors has long been in accordance with it. It has been tacitly accepted, and cannot now be superseded without good cause being shown for such a proceeding. We may reduce the written and unwritten law into one definite form as follows:—

When a section of a genus has received a sectional name it is desirable, but not essential, that that name should be retained if the section is considered as a distinct genus; except in cases where the term is not in accordance with the code of laws laid down in the 'Philosophia Botanica' of Linnæus. But a sectional name derives no claim of priority from its use, as such, over the name given to the same group by the first author who defined it as a distinct genus. Its priority amongst generic names dates from the time of publication of the work in which it is first used generically. The law then is:—

The oldest name used for a genus has priority over even an older name applied to the same group when considered only as a section of a genus.

I therefore hold that *Spergularia* is inadmissible as a generic name because Persoon only gave it to a section of *Arenaria*. Those authors who chose to adopt it, as I think wrongly, ought to quote Presl as its author, for he first used it generically in his 'Flora Cechica' (p. 94) in 1819. But Fries had already defined the same genus as *Lepigonum* in his 'Flora Hallandica' (p. 160) in the preceding year (1818), and his name therefore possesses the priority in date of publication. Presl manifestly considered himself as using the term *generically for the first time;* for he does not append the name of any author to the names of the species, although doing so in the usual manner elsewhere throughout his book.

I consider the names given to sections of a genus to hold very nearly the same position, but rather an inferior one, as those of varieties of species. They are given because some supposed convenience results therefrom. The same term may be repeated in many parts of the same science without inconvenience, for they are never used except in conjunction with the generic or specific name respectively.

C. C. Babington.

NEW PUBLICATIONS.

A Manual Flora of Madeira and the adjacent Islands of Porto Santo and Dezertas. By Richard Thomas Lowe, M.A. London: Van Voorst. Part I.–III.

The third part of this conscientiously worked out Flora is now in

our hands, and comprises the *Myrtaceæ*, *Onagraceæ*, *Lythraraceæ*, *Cucurbitaceæ*, *Passifloraceæ*, *Paronychiaceæ*, *Portulaceæ*, *Mesembryanthemaceæ*, *Cacteæ*, *Crassulaceæ*, *Saxifragaceæ*, *Umbelliferæ*, and *Araliaceæ*. Amongst the new species we find,—*Sedum farinosum* ("Erva Arroz"), *S. fusiforme*, *S. dumosum*, *Ammi procerum*, *Bunium brevifolium*, *Bupleurum salicifolium*, *Œnanthe pteridifolia*, *Monizia edulis*, *Daucus neglectus*, *Torilis tenuifolia*, *T. obscura*, and *T. brevipes*. Mr. Lowe does good service in clearing up the confusion existing in the synonymy of the Madeira and Canary Island *Cacteæ*. We also learn that the attempts lately made to cultivate the cochineal insect in Madeira have failed, mainly from the difficulty of preserving, or obtaining when lost, fresh young insects to restock the Cactus plant annually. The author confirms Webb's statement that the first introduction of the cochineal to the Canaries was strongly opposed by the country people, on the ground of its rendering the "Tuneras" or Opuntia plants barren, and depriving them of their favourite "figos," the insipid fruit of these Cactuses, now seen occasionally at Covent Garden Market.

BOTANICAL NEWS.

The Council of the Royal Horticultural Society offer the following prizes for the encouragement of the study of scientific botany amongst all classes:—1. One silver and two bronze medals, for the three best collections of wild plants of each separate county of the United Kingdom, dried, mounted on paper, folio demy size, classified according to the natural system, and labelled with the name of the locality where found, and the date when found. Intending competitors may obtain the forms of labels on sending twelve postage-stamps to the secretary of the Royal Horticultural Society, South Kensington. 2. Three gold medals will be given for the three best of all the collections out of all the several county collections. Not more than one of the medals can be awarded in one county. The collections must be delivered on or before the 31st of December, 1864. A gold medal will also be awarded to every exhibitor of a new species of plant found growing in the United Kingdom.

We are authorized to contradict the report which was inserted in a late number of this Journal, that Dr. Lankester had resigned the Examinership of Botany at South Kensington.

The Herbarium, with the MSS. and drawings of the late Joseph Woods, Esq., author of the 'Tourist's Flora,' have become the property of F. Townsend, Esq.

Hypericum undulatum.

Vincent Brooks, Imp.

ON *HYPERICUM UNDULATUM*, *Schousb.*

By C. C. Babington, M.A., F.R.S.

(Plate XVI.)

At page 45 of the present volume there is a notice of the discovery of this *Hypericum* near Plymouth, and to fulfil the promise then given, these remarks and the accompanying Plate are issued.

The following seem to be the specific character and synonymy of the plant :—

H. undulatum (Schousb.); stem erect, branched, 4-edged, herbaceous; leaves oblong, wavy at the edge, with many pellucid dots, netted with pellucid veins, and (as well as the sepals and petals) with black marginal dots beneath; sepals erect, ovate-lanceolate, acute, usually very bluntly crenate; petals persistent; stamens shortly united in three sets; styles 3, not half as long as the capsule.

H. undulatum, *Schousb. in Willd. Enum.* 810 (1809). *Welw.! Iter Lus. n.* 171 (*spec.*). *Reichenb. Hort. Botan. t.* 39.

H. Bœticum, *Boiss. Elench.* 25 (1838); *Voyage, t.* 34. *Walp. Repert.* i. 383. *Syme! in Eng. Bot.* ii. 153. *t.* 270 *bis.*

H. decipiens, *Wats.! in Lond. Journ. Bot.* iii. 589 (1844). *Walp. Repert.* v. 141.

H. Neapolitanum, *Ten.! Ind. Sem.* 1839; *Syl. Pl. Neapol.* 385. *Guss. Fl. Sic. Syn.* 379.

H. quadrangulum, *Lowe! Fl. Mad.* 79.

H. quadrangulum, ϵ. undulatum, *Choisy in De Cand. Prod.* i. 548.

Hypericum, sp., *Welw.! Fl. Lusit. n.* 1162 (*spec.*).

Stem 2–3 feet high. Leaves declining, more or less conspicuously wavy at the edge, abundantly uniformly and pellucidly dotted throughout. Flowers in very lax, much branched cymes. Petals yellow, with a longitudinal dash of red externally on their sinistral side, and black dots on their dextral side. Anthers with a black dot. Styles 3, divaricate.

The localities in Devonshire are carefully described by Mr. Briggs, the fortunate discoverer of them, at p. 46 of this volume.

The annexed interesting letter, from Dr. A. Braun, proves that our plant is the *H. undulatum*. Welwitsch's specimen (no. 171) is much stronger than the English plant, the leaves are much more markedly wavy

at the edge, the stem bears many black dots, and the cyme is closer; but an unnamed specimen from him (n. 1162) gathered at S. de Estrella, is much more like our plant. The plate of *H. undulatum*, given by Reichenbach, is probably incorrect. He represents the leaves as crenately wavy at the edges and plicate along the "vena pennivia." Boissier's plate and my specimens of *H. undulatum*, *H. Bœticum*, *H. Neapolitanum*, and *H. decipiens*, have the edges of the leaves (often very minutely) wavy and the venation "5–6-nervia." Boissier says nothing of the waviness nor plication, and figures the leaves as if plane. He makes no remark upon the dash of red colour on the petals, which Reichenbach very correctly states is confined to one longitudinal half, and the black dots to the other half of each petal. My specimen of *H. Neapolitanum* was received from Professor Gasparrini, of Naples, as the plant of Tenore. It rather more nearly resembles the specimen of *H. undulatum* from Welwitsch, than those from Devonshire; but is undoubtedly the same species. Gussone says that the leaves are not furnished with pellucid dots, but they are abundant on Gasparrini's specimens. The Madeiran specimens (from St. Antonio de Serra) are much less branched than the English plant, and the cyme is much smaller and of fewer flowers. There is a rudimentary branch in nearly every axil, and therefore situation or climate is probably the cause of this difference.

The following is a translation of Dr. A. Braun's letter, addressed to the Editor :—

"*Berlin*, 20*th January*, 1864.

"In accordance with your request, I have searched our herbaria for specimens of the *H. undulatum*, Schousb., which is described by Willdenow in his 'Enumeratio Plantarum Hort. Berolinensis.' There is no specimen of it in Willdenow's own herbarium, but there are two in that of Kunth, labelled '*H. undulatum*, Hort. Berol. 1806–1812.' These were gathered in the garden during Willdenow's life. A specimen entirely agreeing with them was placed by Otto in the garden herbarium, which is labelled '*H. undulatum*; habitat in Barbaria.' That these specimens belong to the *H. undulatum* of Willdenow's 'Enumeratio' cannot be doubted. The diagnosis exactly agrees with them. The comparison of the specimens gathered in our garden during the lifetime of Willdenow, with that sent by you as found near Plymouth, leaves no doubt about their specific identity.

There are a few unimportant differences, viz. the leaves of Willdenow's plant are rather narrower than those of the English specimen [not so my specimen from Welwitsch], and they are thicker and less transparent, the principal veins are more prominent on the under side, and the edge more crisp; but the numerous glandular dots are equally transparent in both plants; the black dots also are present upon the edges of the leaves of both, but on that from England they are sometimes diffused over the surface. The black dots on the stem, mentioned by Willdenow, are to be found on both plants, but are not very numerous nor particularly prominent. In the Berlin specimens the inflorescence is very many-flowered, in the English (judging from the one specimen sent) it appears poorer and more lax. The sepals, the form of which constitutes the chief difference between this plant and *H. quadrangulum* (with which De Candolle [or rather Choisy] unites it as a variety) are in the plant of Willdenow narrower and more pointed than in the English example. But these differences are very slight.

"That part of the corolla which in æstivation is not covered, is reddish on the outside, as is specially noticed by Willdenow. This is also the case with the plant found by Mr. Briggs. Both the English and Berlin specimens have a few minute black dots on the other paler part of the petals. There is also a black dot on the anthers of both plants.

"The specimens collected by Welwitsch in Portugal [Unio Itineraria] and issued as part of his 'Iter Lusitanicum,' n. 171, agree prefectly with Willdenow's plant.

"A cultivated specimen of *H. decipiens*, Wats., received from himself, agrees better in habit with the English than with the plant of Willdenow; but the leaves are more wavy on the edge and the sepals rather broader [not constantly] than those of the latter. I quite believe that *H. decipiens* must be combined with *H. undulatum*. There is more doubt about the identity of *H. Bæticum*, Boiss., with them; and I should rather be inclined to consider it as a variety. A specimen before me, collected in Granada (Bourgeau, n. 24), and one derived from a root lately cultivated in our garden, have decidedly broader and more pointed sepals:—'sepala ovato-lanceolata' is Boissier's specific character. The corolla seems smaller, and, as far as I can judge from dry specimens, it is of a paler yellow, not red, on the outside. The petals bear fewer black dots, and the edges of the broader leaves

have only a trace of waviness. But these differences are not of great importance.

"The Tenorean *H. Neapolitanum* is unknown to me, but I possess a specimen of undoubted *H. undulatum*, from Messina, collected by Professor Hæckel, of Jena, which proves that that species inhabits Sicily."

So far Dr. Braun. Dr. Bolle states that he is well acquainted with *H. undulatum*, and that it is not a native of the Canary Islands.

The true nomenclature of this plant seems settled by the information that we now possess, and its range is extensive. Apparently it is not a very abundant plant anywhere. Its known localities are Algeria, Italy, Sicily, Spain, Portugal, Madeira, Azores, and south-western England.

Our Plate represents a specimen sent by Mr. Briggs. A bit of the stem (but the artist has omitted the black dots on the wings), an enlarged piece of a leaf (of which the margin is not so well represented as could have been wished, it is really wavy, not crenate), are added separately, as well as a flower and germen.

EXPERIMENTS ON THE YIELD OF ALKALOIDS FROM THE LEAVES OF CHINCHONAS GROWN IN JAMAICA, BY DR. DANIELL, F.L.S.

In November, 1861, a number of young Chinchona shoots, from 2 to $2\frac{1}{2}$ inches high, were transferred from the gardens of Bath to the Cold Spring coffee plantation, which is situated among the mountains about 4000 feet above the sea-level. The species selected were *Chinchona succirubra*, *C. micrantha*, and *C. nitida*. By the end of the first year, one of the hardiest plants of the first species was 44 inches high, and had leaves over 13 inches long by 8 wide. In two years it was 6 feet high, with ten branches, and a stem nearly 5 inches in circumference at the base. The progress of the other species was equally satisfactory, and the latest reports speak of the whole of them as being in a remarkably healthy and flourishing state.

Mr. Wilson forwarded to Dr. Daniell leaves from the various species.

In his experiments he followed the formula given by the Edinburgh College of Physicians for the preparation of Quinine from Yellow Bark, on account of the ease and simplicity of the process. The result was that the leaves of *C. succirubra* yielded as much as from ·75 to 1·00 per cent. of alkaloids. The characteristic white acicular crystals of Quinine deposited on the evaporating glass could be plainly discerned by the naked eye, and presented a striking contrast to the larger, flat, four-faced, oblique prisms of Chinchonine procured from the residual liquor. From a few young leaves of *C. micrantha* and *C. nitida*, Sulphate of Chinchonine, with other amorphous crystalloids, probably Chinchonidine or Quinidine, were obtained, but owing to the limited quantity of material submitted for analysis, no definite proportions could be determined.

The Red Bark (*C. succirubra*) is the most valuable of all the *Chinchonæ*, as it yields a richer percentage of Quinine and Chinchonine than any other species, not even excepting the famous Yellow Bark (*C. Calisaya*). The young shoots of this species are readily propagated, and have proved in Jamaica the most vigorous and hardy, Mr. Wilson having found less difficulty in preserving them alive than any of the other species. He has planted them in the open spaces between the coffee bushes, where they are freely exposed to the influences of fresh air, rain, and sunshine, and they have required no special attention other than the occasional clearance of weeds. Dr. Daniell attaches considerable importance to the relative proportion of the alkaloids in this species. His experience of the employment of Chinchonine instead of Quinine at Sierra Leone showed that it induced vertigo and cerebral congestion to such an extent as to compel him to discontinue its use, and his further observations in Jamaica confirm him in this opinion. The toxic or stimulant properties of Chinchonine he considers to be equal to those of Quinine, but the therapeutic or curative power is greatly inferior, being, according to his own observations in West Africa and Jamaica, in the proportion of 2 to 5, and in the the reports of the French army surgeons, so low as 3 to 10.

CONTRIBUTIONS TO A FLORA OF THE SCILLY ISLES.

By F. Townsend, Esq., M.A.

The Phanerogamous plants and Ferns enumerated in the following list were observed during a short stay made in the Scilly Isles from the 21st of June to the 1st of July, 1862. My time having been so limited, the list and notes must necessarily be incomplete, but as no attempt has hitherto been made to publish anything like a complete catalogue, I trust that the present contributions may not be devoid of interest and value. A further search, particularly at a different season, would doubtless swell the list, and might result in the discovery of such plants as *Corrigiola littoralis*, *Illecebrum verticillatum*, *Polycarpon tetraphyllum*, *Ophioglossum Lusitanicum*, *Isoëtes Hystrix*, etc. etc.

The whole group of the Scilly Isles is included in an area of about ten miles long by five broad. Of the thirty-eight principal islands only five are inhabited, viz. St. Mary's, St. Martin's, Tresco, Bryer, and St. Agnes; most of the others, amounting to upwards of a hundred, are little else than bare rocks. The group lies about twenty-four miles almost west of the Land's End, in Cornwall, but the greater number of islands have a more southern latitude than the Lizard Point. Tresco, which is one of the northernmost, has the same latitude as the Lizard, 49° 58′ N. St. Agnes, the southernmost inhabited island, lies six miles further south; hence the southernmost and westernmost soil of England is to be found in the Scilly Isles.

St. Mary's, the largest island, is nine miles in circumference; the country and the soil is more varied than in the other islands. "The Heugh," south of Star Castle, consists principally of waste land of moderate elevation, covered with stunted gorse and scanty herbage. This spot was fortified in the reign of Elizabeth by a strong low wall, extending all round the Heugh, which still exists. There is a large tract of elevated waste land at Peninnis Head, bearing little but gorse and heather. Extensive marshlands occur in the neighbourhood of Heugh Town and Old Town; these are intersected by freshwater ditches. At Old Town there is a large freshwater pool. Newford Downs are very barren and covered with gorse and heather. There is little sandy ground in St. Mary's, it occurs principally about St. Mary's Town and at Permellin Bay or Porthloo Bay.

Tresco is the island on which Mr. Smith, the present owner of the whole group, has fixed his abode, and a walk through his tastefully laid-out pleasure-grounds and gardens will afford abundant proof of the mildness of the climate, for here are to be found, flourishing in open air, many plants, shrubs, and trees, natives of much more southern latitudes.* There is a considerable extent of sandy ground, near Crow Point, with sand-hills, on which occur *Psamma arenaria* and *Euphorbia Portlandica*, etc. A large and shallow freshwater pool nearly divides the island, and on its shores grow *Elatine hexandra*, *Littorella lacustris*, etc. The interesting purple-flowered Trefoil, of which a figure was given in No. 13 of this Journal, grows very abundantly on the flat sandy ground south of the pool. On sloping ground to the south-west of the pool is a plantation, consisting chiefly of *Pinus maritima*, *P. sylvestris*, and *Acer Pseudoplatanus*. Below it is a withy-bed. Almost the whole of the island north of New Grimsby Harbour, and the part above Apple-tree Point, is waste, the herbage being stunted heather, gorse, etc. To the west of this, between Braiden Point and Oliver's Castle, occurs *Euphorbia amygdaloides*; *Pteris aquilina* is here very fine. This is a sheltered spot, and might repay further examination.

St. Agnes lies to the extreme south, and is more exposed than the other islands; barley is the only grain cultivated on it. The centre of the island is generally under culture, but the land round the coast is waste, and the herbage very starved, in many places not rising above an inch from the ground. To the south-east, near Tinflat Point, it consisted of the following plants:—*Sagina procumbens*, *Trifolium minus*, *Lotus corniculatus* var., *Radiola Millegrana*, *Sedum Anglicum*, *Plantago Coronopus*, *P. lanceolata*, *Anagallis tenella*, *Armeria maritima*, *Calluna vulgaris*, *Festuca rubra*. In a grass field, probably only two years old, the crop consisted of *Serrafalcus mollis*, *Holcus lanatus*, *Poa trivialis*, *Lolium perenne*. Another grassfield was, however, most rich in a fine growth of *Lotus hispidus*, a foot high, and looking as if it had been intentionally sown, but I was informed it was not. This island is the reputed habitat for *Acanthus mollis*, but I did not observe it.† There

* A list of plants which will grow in the open air in the Scilly Isles, but will not grow in the open air at Oxford, will be found in Daubeney's 'Climate,' p. 142.

† The Rev. J. P. Mayne sent it to Professor Babington in 1851. He said that it grew on a spot separated from some houses by a narrow field, on the south side of a hedge, upon some heaps of stones collected there on the destruction of an old

is a freshwater pool in Priglis Bay; the ground is sandy, and affords masses of *Littorella lacustris* and *Trigonella ornithopodioides*. There is a high and very dry mass of rock to the south and west, the only Fern on which is *Asplenium marinum*.

St. Martin lies to the extreme north-east. Its southern slopes are cultivated, and yield good crops. Most of the soil north and west of Middle Town is sandy, and the remarkable variety of *Ophioglossum vulgatum*, which I shall notice again at some length, occurs there.

Bryer is a small island, and very barren to the north. It has a freshwater pool east of Gweat Hill.

Nearly adjoining Bryer is Samson, entirely uncultivated, though it has some good grass fields; it was formerly inhabited; the ruined cottages are quite covered with *Asplenium marinum*.

The mean summer temperature of the Scilly Isles is 58°; the mean winter temperature is 45°. During my visit the thermometer did not rise above 62°, or sink lower than 54°. The prevalent winds are the S.W. and S.S.W. The highest land rises about 200 feet above the level of the sea. In none of the islands are there any deep valleys or gorges, either central or leading down to any of the bays; consequently there is little shelter.

Almost the only trees are the Elm, the Apple, and the Pear; the Elms are planted as a protection round the orchards, and are covered with Ivy. The Apple-trees are said to bear remarkably well, and though small and stunted, they appeared very healthy; the largest orchard belongs to Mr. Banfield, and is in Holy Vale, St. Mary's.

It appeared to me that the soil, in many of the barren wastes, was sufficiently deep to be brought under cultivation, if shelter were afforded by shrubs or trees; but few have been planted for this purpose, except round the orchards.

The principal wealth of the islands is derived from the export of early potatoes for the London market. I am informed that cargoes of these are shipped as early as February. Wheat, barley, mangel, and turnips are the principal crops.

The granite of which the islands are entirely composed, is probably

lane. An old man who rents the field told him that he remembered the plant being in that place for fifty years; another man vouches for forty years. It covered a space of about twenty feet by five or six. Mr. Mayne stated that he had ascertained that there was not even a single garden in St. Agnes twenty years before 1850. It is difficult to see how it can have got to Scilly. (Ann. Nat. Hist. Ser. 2, viii. 505.)

a continuation of the Cornwall and Devonshire range. It frequently lies close to the surface, but Mr. Statham* gives the following variety and order of strata, which he states to be very general throughout the islands :—

1. Black surface-soil with sand.
2. Fine ash-coloured sand, containing fragments of shells.
3. Reddish and chocolate clay, with angular granite blocks.
4. Decomposed granite rubble, with larger granite masses.
5. Granite rock.

These beds vary considerably in thickness in different localities. He thinks the occurrence of sand on the highest elevations a proof of frequent submergence, but he does not specify, or give any particulars respecting, the shells which he found in it. The recent deposits deserve the most careful examination, because of the important bearing they have on the age of our southern flora.

On comparing this insular flora with that of the mainland, it is evident that both are derived from the same source by migration and not by transport. All the species hitherto met with in the Scilly Isles occur also on the nearest mainland, except *Arthrolobium ebracteatum*, a native of the Channel Islands and of France. Taking the law of migration from specific centres as granted, the plants of the French type have spread into these islands and the mainland, from the south or south-east, and in both cases the spreading must have taken place during the existence of a vast continent, now partly occupied by the sea, which flowed in as a barrier before the *Arthrolobium* spread further than the Scilly Isles.

It is true there seems hardly sufficient evidence to prove that any of the land south and south-west of the Thames was submerged during the glacial period ;† but even if no such submergence took place, it is scarcely possible that the southern flora could have survived the glacial period; it is much more probable that the extreme rigour of the climate destroyed it, and that it gave place to one of more arctic type ;‡ in

* "Geology of the Scilly Isles," read before the British Association, Sept. 23, 1858, by Rev. F. F. Statham, F.G.S.

† 'The Antiquity of Man,' by Sir Charles Lyell; also a paper by J. Trimmer, who held a contrary opinion, Proc. Geol. Soc., June, 1853, *etc.*

‡ See 'Origin of Species,' by Charles Darwin, chapter on "Geographical Distribution," etc.; also Mr. Austen's paper on the valley of the English Channel (Quar. Journ. Geo. Soc., vol. vi.); he is disposed to think our characteristic south of England flora to be of pliocene origin.

which case, as well as in that of entire submergence, the Atlantic flora must have reached us at the same time with the great German migration, that is, during the second continental period subsequent to the glacial epoch.

The following is a summary of the plants observed :—

Dicotyledones, 269.	Thalamifloræ	64
	Calycifloræ	75
	Corollifloræ	104
	Monochlamydeæ	26
Monocotyledones, 68.	Floridæ	19
	Glumiferæ	49
Filices		11
	Total	348

The Atlantic type of Mr. Watson is represented by about $\frac{1}{18}$ of the whole flora. In Cornwall it is represented by rather less than $\frac{1}{17}$. The Scilly plants are distributed as follows, according to Mr. Watson's table in his summary of distribution (Cyb. Brit. iv. p. 175) :—

British type	238
English type	76
Atlantic type	25
Germanic type	1
Local type	3
Doubtful type	5
	348

These types refer only to the distribution of English plants in England, and not to their distribution in Europe.

In the general nomenclature I have taken as my text-book Babington's 'Manual of British Botany,' ed. 5.

In all cases where the locality is not given, it is to be understood that the plant is generally distributed in the larger islands.

Ranunculaceæ.

Ranunculus Baudotii, *Godr.*—Common in all the freshwater pools in St. Mary's, St. Agnes, Tresco, and Bryer, and retaining much the same appearance whether in deep or shallow water or on dry land. Stamens usually shorter than the pistils. The Scilly plants are somewhat intermediate between this and *R. confusus*, Godr.—β. R. confusus, *Godr.* Bryer, St. Mary's, etc. I follow Mr. Syme in uniting this to *R. Baudotii*. My experience leads me to believe that the Batrachian Ranunculi have been too much divided.

R. hederaceus, *L.*—Common in the marshes in St. Mary's, etc.

R. Flammula, *L.*—Common, and often very fine.—*β*. R. reptans, *L.* Common in wet places near the freshwater pools in St. Mary's and Tresco. A form with *all the leaves* elliptic or elliptic-lanceolate, on very long and slender petioles, those of the lower leaves fifteen times the length of the blade, grows in Tresco pool, in shallow water, with *Helosciadium inundatum*.

R. repens, *L.*—Common.

R. bulbosus, *L.*—Frequent.

R. hirsutus, *Curt.*—Not common. On the sandy flats, near the freshwater pools of St. Mary's and St. Agnes.

R. parviflorus, *L.*—Rare. Near Star Castle, St. Mary's; St. Agnes.

Papaveraceæ.

Papaver dubium, *L.*—Common on cultivated land. *P. Rhœas*, L., may occur, but I am not quite sure that I noticed it.

Glaucium luteum.—I have chequed this without comment.

Fumariaceæ.

Fumaria confusa, *Jord.*—Common on cultivated land.

Cruciferæ.

Nasturtium officinale, *L.*—Rare. St. Mary's, etc.

Cardamine pratensis, *L.*—St. Mary's.

C. hirsuta, *L.*—Rare?

Sisymbrium officinale, *Sch.*— Common.

Sinapis nigra, *L.*—Neighbourhood of Heugh Town.

Koniga maritima, *R. Br.*—One specimen on the shore near Heugh Town.

Cochlearia Danica, *L.*—St. Martin's. Probably overlooked elsewhere.

C. officinalis, *L.*—Locality not noted.

Thlaspi arvense, *L.*—Cultivated land, not unfrequent.

Capsella Bursa-pastoris, *DC.*—Common.

Senebiera Coronopus, *Poiret.*—Common on waste ground near houses.

S. didyma, *Pers.*—Common on waste ground near houses.

Cakile maritima, *Scop.*—Not common.

Raphanus maritimus, *Sm.*—Frequent on waste ground near the shores.

Resedaceæ.

Reseda lutea, *L.*—Rare. St. Mary's.

R. suffruticulosa, *L.*—Common on waste ground around Heugh Town; doubtless an escape.

Violaceæ.

Viola sylvatica, *Fries.*—Common; a dwarfed form frequent on the downs and in exposed situations.

Polygalaceæ.

Polygala vulgaris, *L.*—Common; often very starved, the branches hardly exceeding an inch in length.

P. calcarea, *F. Sch.*—St. Martin's. Only one small specimen; it may have been overlooked elsewhere.

Elatinaceæ.

Elatine hexandra, *DC.*—Margin of Tresco pool, near Mr. Smith's house.

Caryophyllaceæ.

Saponaria officinalis, *L.*—Tresco, near New Grimsby.
Silene Anglica, *L.*—Very common on cultivated ground.
S. maritima, *With.*—Rare. Only observed on the walls of Star Castle Moat, and on the heights of Samson Island.
Lychnis Flos-cuculi, *L.*—Rare. Old Town Marsh.
L. diurna, *Sibth.*—Frequent.
L. Githago, *Lam.*—Rare. Cornfields in St. Mary's.
Sagina procumbens, *L.*—Almost everywhere.
S. ciliata, *Fries.*—Very common and very distinct; the eye detects it immediately, even at a distance; it grows both in open, waste, and exposed places, and in cultivated ground. In the Scilly plants the upper part of the pedicels, and the calyx, are always glandular-hairy, the sepals, though adpressed to the capsule, have their tips patent, and usually acute.
S. apetala, *L.*—Common.
S. maritima, *Don.*—Common. Near the sea.—β. S. debilis, *Jord.* To this I refer a plant growing in the sandy ground in St. Martin's, with a central flowering stem, lengthened prostrate branches, and capsule generally shorter than the calyx.
Honckeneja peploides, *Ehrh.*—Not common, except near Heugh Town, on the sandy beach.
Arenaria serpyllifolia, *L.*—Common, but small, and not easily detected.
Stellaria media, *Wither.*—Common.—γ. S. neglecta, *Weihe*, also occurs.
S. uliginosa, *Murr.*—Common in the marshes.
Cerastium glomeratum, *Thuil.*—Frequent.
C. triviale, *Link.*—Very common.
C. tetrandrum, *Curt.*—Almost everywhere; sometimes so minute as to bear only one flower, at other times branching loosely; and in loose sandy places at Tresco and St. Mary's, densely tufted, bearing many thousand flowers. I believe the fruit pedicels of this species to be very variable; the capsule is frequently sessile.

Malvaceæ.

Malva sylvestris, *L.*—Common.
M. rotundifolia, *L.*—Common.
Lavatera arborea, *L.*—Common on the Heugh, and elsewhere in the different islands. From its position I should doubt its being indigenous, though it is very abundant, but I have since heard from Mr. Smith, that it occurs also in very wild situations.

Hypericaceæ.

Hypericum humifusum, *L.*—Common.
H. elodes, *L.*—In the Marshes.

Aceraceæ.

Acer Pseudo-platanus, *L.*—Introduced in the east of Tresco.

Geraniaceæ.

Erodium maritimum, *Sm.*—Almost everywhere.

E. cicutarium, *Sm.*—Common, but less so than *E. maritimum.*—α. pilosum, *Reich.* 'Deutschlands Flora,' f. 4864; E. pilosum, *Bor.* Sandy ground, St. Martin's and elsewhere. Stem branched and diffuse. Leaves oblong, crisped or incurved; rachis without teeth; leaflets sessile, ovate, obtuse, divided into linear obtuse segments. Stipules ovate or oblong, acuminate. Peduncles few-flowered (2–3 in Scilly specimens), longer than the leaves. Glands of the ovary truncate, emarginate. Carpels small, furrow below the small suborbicular depression hardly any or none. Stem, leaves, and calyx covered with short white hairs, which are sometimes glandular (*E. sabulicolum*, Jord.). The whole plant is very sweet smelling, with quite a different scent from that of *E. cicutarium.*

E. moschatum, *Sm.*—Occasionally.

Geranium molle, *L.*—Very common.

G. dissectum, *L.*—Frequent.

Linaceæ.

Linum angustifolium, *Huds.*—Sandy ground; near the sea, east of Heugh Town.

L. catharticum, *L.*—St. Martin, to the north of the island.

Radiola Millegrana, *Sm.*—Abundant everywhere, growing irrespective of elevation or soil; densely or loosely branched, sometimes very starved, and bearing only one or two flowers.

Leguminosæ.

Sarothamnus scoparius, *Koch.*—Rare.

Ulex Europæus, *L.*—The principal vegetation in many of the most exposed and barren places.

U. nanus, *Forst.*—Very plentiful, Mr. Smith; though I overlooked it.

Medicago lupulina, *L.*—Common. Known in Scilly as 'Natural Grass.'

M. maculata, *Sibth.*—Occasionally.

Melilotus officinalis, *Willd.*—New Grimsby, Tresco, near the beach.

Trifolium pratense, *L.*—Common.

T. arvense, *L.*—Abundant in many places; very fine in a sandy gorge, near Middle Town, St. Martin's.

T. striatum, *L.*—Common.

T. subterraneum, *L.*—Common.

T. glomeratum, *L.*—Common, particularly on the earthed walls.

T. repens, *L.*—Common. A handsome variety occurs with the upper parts of the petals of a rich purple, *becoming much deeper when dry*, but apparently presenting no other characters to separate it from *T. repens*, L. See Professor Babington's Papers in 'Journal of Botany,' Vol. II. p. 1, where a coloured plate is given (tab. 13), executed from living specimens, kindly sent from

Scilly, at my request, by Mr. Augustus Smith. My first impression on seeing this lovely Trefoil was, that it might be distinct, but I quite concur with Professor Babington, in referring it to *T. repens*, L. Little confidence can be placed in the character of the prominence of the leaflet veins. The plant grows abundantly in the low wet sandy flats near Tresco Pool, and I believe I noticed it elsewhere both in Tresco and in the other islands.

T. ornithopodioides, *L.*—Probably frequent. St. Mary's, and St. Agnes. Very abundant on the wet sand by the freshwater pools in St. Martin's and Bryer; also in waste places on the higher land.

T. procumbens, *L.*—Probably rare.—St. Mary's.

T. minus, *Sm.*—Common.

T. filiforme, *L.*—Rare? St. Martin's.

Lotus corniculatus, *L.*—Almost everywhere; very variable in size, and in the hairiness of its parts.—β. villosus, *Ser.* St. Martin's.—γ. crassifolius, *Pers.* One of the most common forms.

L. major, *Scop.*—Common, and not by any means confined to the low ground.

L. hispidus, *Desf.*—Abundant in many fields, and very frequent on the barren and grassy slopes in all the islands.

Vicia hirsuta, *Koch.*—Common.

V. tetrasperma, *Mœnch.*—Common.

V. Cracca, *L.*—St. Martin's, Tresco; rare.

V. sativa, *L.*—Withy bed, Tresco.—β. V. angustifolia, *Roth.* Common.—γ. V. uncinata, *Boreau?*, Flor. du Cent. ed. 3, p. 173. Sandy hollow in St. Martin's. Stem about 2 ft. high, erect, slender, branched. Leaflets 8–10, of the lowermost leaves obovate, of the upper linear, all truncate, emarginate, mucronate; stipules somewhat trapeziform, toothed, or lanceolate acuminate with a lateral basal toothed appendage; teeth curved forwards. Flowers axillary, shortly stalked, 1–3 together. Calyx-teeth equal, subulate lanceolate, about as long as the tube. Pod . . . Bor. observes that his plant is very like *V. Bobartii*, Fost., from which it may be distinguished by its stipules, and by the leaflets being all truncate. This is named provisionally, as I have not seen foreign specimens.

Lathyrus sylvestris, *L.*—Rare. I only saw one plant, and being hardly in flower, it may have been overlooked elsewhere.

Ornithopus perpusillus, *L.*—Common. It occurs frequently with the pod and calyx quite glabrous.

Arthrolobium ebracteatum, *DC.*—Frequent on the grassy slopes in all the islands.

Rosaceæ.

Prunus spinosa, *L.*—Wild in several places, Mr. Smith.

Alchemilla arvensis, *L.*—Common.

Potentilla anserina, *L.*—Common.

P. reptans, *L.*—Occasionally.

P. Tormentilla, *Nesl.*—Very common.

Rubus* rhamnifolius, *W. and N.*—St. Mary's.

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* I am indebted to Professor Babington for determining the *Rubi*.

R. villicaulis, *W. and N.*—On the high ground in Tresco.
R. macrophyllus, *Weihe.*—*a.* umbrosus? R. carpinifolius, *Blox.*, not *W. & N.*—In St. Mary's Marshes.
R. Kœhleri, *Weihe.*—Tresco.
R. diversifolius, *Lindl.*—Hedges in the interior of St. Mary's.
Rosa canina, *L.*—One specimen in Heugh Town Marshes.
Cratægus Oxyacantha.—In hedges.

Lythraceæ.

Lythrum Salicaria, *L.*—St. Mary's.

Tamariscaceæ.

Tamarix Anglica, *Webb.*—St. Mary's Marsh. Not wild.

Onagraceæ.

Epilobium obscurum, *Schreb.*—Common? In St. Mary's Marshes.

Haloragaceæ.

Myriophyllum alterniflorum, *DC.*—Tresco lake.

Portulaceæ.

Montia fontana, *L.*—Common on wet ground.—*β.* M. rivularis, *Gm.* St. Mary's Marshes.

Paronychiaceæ.

Lepigonum rubrum, *Fr.*—I believe I noticed this plant, but omitted it in my catalogue.
L. rupestre, *Kindb.*—Common.
L. neglectum, *Kindb.*—Old Town Marsh.
Spergula arvensis, *L.*—Common in cornfields.

Crassulaceæ.

Sedum Anglicum, *Huds.*—One of the most abundant and showy plants on the cliffs, walls, rocks, etc.
S. acre, *L.*—Rare. Shore near Old Town, and in one other locality.
Cotyledon Umbilicus, *L.*—Very common.

Umbelliferæ.

Hydrocotyle vulgaris, *L.*—Common around the freshwater pools in the several islands; in the marshes of St. Mary.
Eryngium maritimum, *L.*—Shores at Heugh Town and elsewhere.
Conium maculatum, *L.*—Common in many places. Abundant on the shore round Heugh Town.
Smyrnium Olusatrum, *L.*—Waste places, Heugh Town.
Apium graveolens, *L.*—Shores in several places.
Helosciadium inundatum, *Koch.*—Tresco lake. Freshwater pool in Bryer.
H. nodiflorum, *Koch.*—Common in marshy places round the freshwater lakes.

Bunium flexuosum, *With.*—One specimen near Higher Town, St. Martin's.
Œnanthe fistulosa, *L.*—Common in Heugh Town and Old Town Marshes, etc.
Œ. crocata, *L.*—Ditto.
Æthusa Cynapium, *L.*—One specimen near Heugh Town.
Fœniculum vulgare, *All.*—Around Heugh Town, and waste places near buildings.
Crithmum maritimum, *L.*—Very common.
Angelica sylvestris, *L.*—Common in marshy places.
Pastinaca sativa, *L.*—Rare. West of Heugh Town; near Higher Town, St. Martin's, etc.
Heracleum Sphondylium, *L.*—Common.
Daucus Carota, *L.*—Common.
D. gummifer, *Lam.*—Common?
Torilis nodosa, *Gært.*—Common.

Araliaceæ.

Hedera Helix, *L.*—Trees and walls round the orchards, and on rocks.

Caprifoliaceæ.

Sambucus nigra, *L.*—St. Mary's, near houses.
Lonicera Periclymenum, *L.*—Common. Very fine in Heugh Town Marsh.

Rubiaceæ.

Rubia peregrina, *L.*—Tresco, N.W. of Crow Point, close to the coast.
Galium verum, *L.*—Common.
G. palustre, *L.*—Marshy ground. Common.—β. G. elongatum, *Presl.*—Marshy ground. Common.
G. saxatile, *L.*—Common.
G. Aparine, *L.*—Common.
Sherardia arvensis, *L.*—Not common.

Compositæ.

Senecio vulgaris, *L.*—Common.
S. sylvaticus, *L.*—Frequent.
S. Jacobæa, *L.*—Common.
Gnaphalium uliginosum, *L.*—Common.
Filago Germanica, *L.*—Common.
Bellis perennis, *L.*—Local.
Chrysanthemum segetum, *L.*—In cornfields, Holy Vale, etc.
Matricaria inodora, *L.*—Common.—β. M. maritima, *L.*—Common.
Artemisia Absinthium, *L.*—About Heugh Town, and in other localities near houses.
A. vulgaris, *L.*—Not common.
Anthemis nobilis, *L.*—Common.
A. Cotula, *L.*—Holy Vale, St. Mary's.
Achillea Millefolium, *L.*—Common.

Arctium pubens, *Bab.*—Tolerably common, and I believe the only species.*
Centaurea nigra, *L.*—Not common.
Carduus tenuiflorus, *Curt.*—Common.
C. lanceolatus, *L.*—Common.
C. palustris, *L.*—Common in the marshes.
C. arvensis, *Curt.*—Not very common?
Lapsana communis, *L.*—One specimen on cultivated ground, St. Agnes.
Hypochæris radicata, *L.*—Common in waste places and cultivated ground.
Thrincia hirta, *DC.*—Common.
Apargia hispida, *Willd.*—Common.
A. autumnalis, *Willd.*—Common.
Leontodon Taraxacum, *L.*—Local.
Sonchus asper, *Hoff.*—Rare, sandhills to the south of Tresco.
S. oleraceus, *L.*—Very common.
Crepis virens, *L.*—Common.
Hieracium Pilosella, *L.*—Not common.

Campanulaceæ.

Jasione montana, *L.*—Common.
Wahlenbergia hederacea, *Reich.*—Old Town Marshes.

Ericaceæ.

Erica Tetralix, *L.*—Common, Mr. Smith.
E. cinerea, *L.*—Common.
Calluna vulgaris, *Salisb.*—Abundant.

Oleaceæ.

Ligustrum vulgare, *L.*—St. Martin's; St. Samson's: indigenous.

Gentianaceæ.

Erythræa latifolia, *Sm.*—Common.
E. littoralis, *Fries.*—Between Peninnis Head and Heugh Town, and probably in other places.

Convolvulaceæ.

Convolvulus arvensis, *L.*—Not uncommon.
C. sepium, *L.*—Frequent in the marshes of St. Mary's. In Heugh Town Marsh it is very handsome, with variegated pink and white flowers; being rather inaccessible, I unfortunately did not gather it.
C. Soldanella, *L.*—Common on the sandy shores.
Cuscuta Epithymum, *Murr.*—On gorse near and above the Abbey, Tresco.

Boraginaceæ.

Borago officinalis, *L.*—One specimen on waste ground near the sea, east of Heugh Town, doubtless an escape.

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* Professor Babington informs me that his *A. pubens* is really the *Lappa intermedia*, Lange, and his *A. intermedium* the *A. nemorosum*, Lej.

Lycopsis arvensis, *L.*—Common on cultivated ground.
Myosotis repens, *Don.*—Abundant in marshy ground in St. Mary's and Tresco.
I did not observe *M. palustris*, Wither.
M. arvensis, *Hoffm.*—Common.
M. collina, *Hoffm.*—Open places on Newford Down, St. Mary's, Tresco, etc.
The plants from Newford Down were cæspitose, with very lengthened prostrate branches, racemes leafy below, fruit calyx closed. At first I imagined the plant might be distinct, but the differences were probably caused by peculiarity of situation.
M. versicolor, *Ehrh.*—Not uncommon.

Solanaceæ.

Solanum Dulcamara, *L.*—Common.
Hyoscyamus niger, *L.*—Common on waste places near Heugh Town.

Orobanchaceæ.

Orobanche minor, *Sutt.*—Sandy field, near the sea, east of Heugh Town; growing on *Trifolium minus*.

Scrophulariaceæ.

Verbascum Thapsus, *L.*—Tresco, rare.
Digitalis purpurea, *L.*—Common.
Antirrhinum Orontium, *L.*—Occasionally in cornfields.
Linaria Elatine, *Mill.*—Rare? Tresco.
L. spuria, *Mill.*—Rare. Tresco.
Scrophularia nodosa, *L.*—Common.
S. aquatica, *L.*—Not so common as *S. nodosa*.
S. Scorodonia, *L.*—St. Martin's, and in a hedge near Heugh Town, near a pond, about 300 yards along the road which strikes to the left out of the main road leading east from Heugh Town. In numerous specimens observed both in Scilly and in Cornwall, the leaves have large double crenatures, or large crenate-serrate crenatures. The upper leafy bracts are doubly dentate. The stem is distinctly and acutely quadrangular. The staminodium has in front a small, very shallow, central groove, widening upwards.
Pedicularis sylvatica, *L.*—Very common on both high and low land, and on the most barren and exposed heaths.
Eufragia viscosa, *Benth.*—Frequent in marshy ground, St. Mary's.
Euphrasia officinalis, *L.*—Not common.
Sibthorpia Europæa, *L.*—Abundant on the banks of the rivulet on the road leading from Holy Vale towards Heugh Town. Banks of a ditch in the orchards near Old Town Marsh.
Veronica Anagallis, *L.*—I saw what I believed to be a young state of this in the roadside ditch at Holy Vale.
V. Chamædrys, *L.*—Frequent.
V. officinalis, *L.*—Common.
V. serpyllifolia, *L.*—Common.

V. arvensis, *L.*—Common.
V. agrestis, *L.*—Rare?

LABIATÆ.

Mentha viridis, *L.*—Bryer, probably an escape.
M. aquatica, *L.*—Marsh at Old Town.
Lycopus Europæus, *L.*—Rare. Old Town Marsh.
Salvia Verbenaca, *L.*—Rare. Near Heugh Town.
Thymus Serpyllum, *L.*—Common.
Scutellaria galericulata, *L.*—Stony shore, Samson.
Prunella vulgaris, *L.*—Common.
Nepeta Glechoma, *Benth.*—Common.
Lamium purpureum, *L.*—Not common.
L. incisum, *Willd.*—Common, frequent in potato fields.
Stachys palustris, *L.*—Rare. St. Mary's.
S. arvensis, *L.*—Common.
Ballota fœtida, *Lam.*—Heugh Town, etc.
Teucrium Scorodonia, *L.*—St. Martin's, etc., rare.

VERBENACEÆ.

Verbena officinalis, *L.*—Common by roadsides.

PRIMULACEÆ.

Primula vulgaris, *Huds.*—Found by Mr. Smith; he has never seen *P. veris*, L.
Anagallis arvensis, *L.*—Very common. Plant generally light green, flowers very pale pink, and leaves without blotches underneath.
A. tenella, *L.*—Very common even in apparently the most unlikely situations, showing the dampness of the climate; otherwise, the soil being so shallow, it would soon become parched.
Centunculus minimus, *L.*—Very common; another proof of dampness of soil from a moist atmosphere.
Glaux maritima, *L.*—Heugh Town and Old Town Marshes, and marshy places in the other islands.
Samolus Valerandi, *L.*—Common in marshy ground.

PLUMBAGINACEÆ.

Armeria maritima, *Willd.*—Very common. On Annette, it completely covers the ground with a soft cushion of herbage.—β. A. pubescens, *Link.* Annette and elsewhere.

PLANTAGINACEÆ.

Plantago Coronopus, *L.*—Very common, and exceedingly variable.
P. lanceolata, *L.*—Very common; very small, and prostrate in exposed situations. This and *P. Coronopus* form, in many places, the principal herbage of the slopes.
P. major, *L.*—Common.
Littorella lacustris, *L.*—Very abundant around the freshwater pools in the

several islands, growing both in and out of the water, and often forming a plentiful herbage.

CHENOPODIACEÆ.

Salsola Kali, *L.*—Common.
Beta maritima, *L.*—Common.
Chenopodium album, *L.*—Common.
C. murale, *L.*—Common.
Atriplex deltoidea, *Bab.*—Sandy shores, Heugh Town.
A. Babingtonii, *Woods.*—Common.
A. arenaria, *Woods.*—Sandy shore, Heugh Town.

POLYGONACEÆ.

Rumex sanguineus, *L.*—Common.
R. pulcher, *L.*—Common.
R. obtusifolius, *L.?*—Common.
R. Hydrolapathum, *Huds.*—Marshes, St. Mary's.
R. crispus, *L.*—Not common?
R. acetosa, *L.*—Common.
R. Acetosella, *L.*—Common.
Polygonum lapathifolium, *L.*—Occasional; chiefly in the centre of the Island of St. Mary's.
P. nodosum, *Pers.*—Potato-field west of Old Town Marsh.
P. aviculare, *L.*—Common.
P. Convolvulus, *L.*—Common on cultivated ground.

EUPHORBIACEÆ.

Euphorbia amygdaloides, *L.*—Bushy ground near Cromwell's Castle, Tresco.
E. Helioscopia, *L.*—Cultivated ground in Tresco and St. Mary's.
E. Portlandica, *L.*—Tresco and St. Agnes.
E. Peplus, *L.*—Common.
E. Paralias, *L.*—I omitted to note the stations.
Mercurialis annua, *L.*—Common about Heugh Town, St. Mary's.

CALLITRICHACEÆ.

Callitriche verna, *L.*—Common.
C. platycarpa, *Kütz.*—Heugh Town Marsh.
C. hamulata, *L.*, β. pedunculata, *DC.*—In small pools above Middle Town, St. Martin's. The plant is very small, but the pedicels of the fruit are ¼ inch or more in length and strongly deflexed.

URTICACEÆ.

Parietaria diffusa, *Koch.*—Walls about Heugh Town.
Urtica urens, *L.*—Occasional.
U. dioica, *L.*—Common.

AMENTIFERÆ.

The only species of this Order I noticed were the planted Salices in the withy-bed at Tresco.

Orchidaceæ.

Spiranthes autumnalis, *Rich.*—Probably frequent, but from the earliness of my visit I only observed the leaves of two plants, hardly above ground, in St. Agnes.

Iridaceæ.

Iris Pseudacorus, *L.*—Common in the marshes.

Amaryllidaceæ.

Narcissus Pseudo-narcissus, *L.*—A tuft near Star Castle, but doubtless an escape.

Liliaceæ.

Scilla verna, *Huds.*—Tresco, near Old Grimsby, Mr. Smith.
Endymion nutans, *Dum.*—Wet ground nearly opposite the Gull Rock, facing the East, St. Mary's.

Juncaceæ.

Juncus maritimus, *Sm.*—Common in the marshes of Old Town and Heugh Town.
J. conglomeratus, *L.*—St. Mary's.
J. lamprocarpus, *Ehrh.*—Common in moist places, often very small and starved.
J. compressus, *Jacq.*—Common.
J. Gerardi, *Lois.*—Common?
J. bufonius, *L.*—Abundant.
Luzula multiflora, *Lej.*—Common in the marshes of St. Mary's.

Alismaceæ.

Alisma Plantago, *L.*—Tresco.
Triglochin palustre, *L.*—Rare. Old Town Marsh.

Lemnaceæ.

Lemna minor, *L.*—Common in pools and ditches.

Potamogetonaceæ.

Potamogeton polygonifolius, *Pour.*—Marshes of St. Mary's.
P. pectinatus, *L.*—Marshes of St. Mary's.

Cyperaceæ.

Eleocharis palustris, *R. Br.*—Marshes and pools.
E. multicaulis, *Sm.*—Abundant in marshy places.
Scirpus maritimus, *L.*—Common in St. Mary's Marshes.
S. pauciflorus, *Lightf.*—Common.
S. fluitans, *L.*—Frequent in the marshes.
S. setaceus, *L.*—Common.
S. Savii, *S. and M.*—Common. I am not certain whether this or the last is the most common.
Eriophorum angustifolium, *Roth.*—Abundant in Old Town Marshes.
Carex arenaria, L.—Very frequent throughout the islands.

C. stellulata, *Good.*—Common in St. Mary's Marshes.
C. vulgaris, *Fries.*—St. Mary's Marshes; St. Martin's; Tresco; etc.
C. flava, *L.*—Common in the marshes.
C. Œderi, *Ehrh.*—Common in the marshes.
C. binervis, *Sm.*—Common on the heaths, etc.
C. lævigata, *Sm.* β. Schraderi, *Woods.*—Rare. Near Old Town Marsh, St. Mary's.
C. riparia (?), *Curt.*—Old Town Marsh.

GRAMINEÆ.

Anthoxanthum odoratum, *L.*—Frequent.
Alopecurus geniculatus, *L.*—Frequent in St. Mary's Marshes, etc.
Sesleria cærulea, *Scop.*—Tresco, on the west side. It was young, and may have been passed over elsewhere.
Phragmites communis, *Trin.*—Chequed without comment.
Psamma arenaria, *R. and S.*—Near Middle Town, St. Martin's; sandy ground on south side of Tresco.
Agrostis canina, *L.*—Old Town Marsh, Holy Vale, etc.
A. vulgaris, *With.*—Very common.—β. A. pumila, *Lightf.*—Common.
A. alba, *L.*—St. Mary's Old Town, etc.—β. subrepens. Ditch near Old Town. I did not see *A. setacea*, which is so abundant on the heaths in Cornwall.
Holcus lanatus, *L.*—Very frequent and abundant.
Aira caryophyllea, *L.*—Abundant.
A. præcox, *L.*—Frequent.
Arrhenatherum avenaceum, *Beauv.*—Not common. Near Old Town, and in several other places.
Triodia decumbens, *Beauv.*—Very frequent and abundant, sometimes forming a thick herbage on wet or moist ground. Culms ascending and often 2 feet long.
Poa annua, *L.*—Frequent.
P. pratensis, *L.*, β. subcærulea.—St. Martin's and St. Mary's. I did not see the typical form of this species.
P. trivialis, *L.*—Very abundant, the herbage often formed principally of this species.
Glyceria fluitans, *R. Br.*—Not common. Heugh Town Marshes, etc.
G. plicata, *Fries.*—Rare. St. Mary's Marsh.—var. nana. In ditches and wet places in the marshes of St. Mary's, a small and generally prostrate plant occurs frequently. (I have met with it also in Surrey, growing on wet ground by the margin of a pond.) The following are the characters:—Leaves usually flat, obtuse, and apiculate; sheaths smooth, not furrowed. Panicle nearly simple, its base usually included in the sheath of the uppermost leaf. Spikelets linear, 8–11-flowered; lower pale, not twice as long as broad; apex obtuse-angled, three-toothed. Anthers not twice as long as broad, purple. Caryopsis oblong-elliptical.

The plant when dry is very flaccid, and will not support its own weight when

held up by the base of the culm; whereas *G. fluitans* has a firm and stiff character, and will support its own weight perfectly. It differs further from *G. fluitans* in the leaves being flat (they are usually folded in *G. fluitans*), obtuse, and apiculate, the lower pale, scarcely twice as long as broad, and the anthers scarcely twice as long as broad. From *G. plicata* it differs in the sheaths being smooth, not furrowed, the caryopsis oblong-elliptical (that of *G. plicata* being oval-elliptical), and the plant of a much smaller size, etc.

Small forms of *G. fluitans* occur in the same locality, but the two plants are easily distinguished.

I have thus fully described this plant because I wish to call particular attention to it. I may here observe that I have never yet met with *G. pedicellata*, Towns. (see A. N. H. ser. 2, v. p. 105) in mature fruit. When young the ovary appears healthy, but later it usually becomes infested with smut, and the fruit is not perfected.

Sclerochloa rigida, *Link*.—Common?

S. loliacea, *Woods*.—Common.

Cynosurus cristatus, *L*.—Frequent.

Dactylis glomerata, *L*.—Frequent.

Festuca sciuroides, *Roth*.—Frequent. A small, tufted, and prostrate form frequently occurs.

F. ovina, *L*.—Abundant.

F. rubra, *L*.—Abundant.

Bromus sterilis, *L*.—Rare. St. Mary's, near Heugh Town; Tresco, heights above the Abbey.

Serrafalcus mollis, *Parl*.—Very frequent. Also the small pubescent form, with single panicle and short pedicels.

Brachypodium sylvaticum, *R. and S*.—Frequent.

Triticum repens, *L*.—St. Mary's, etc.—β. littoreum.—Near Old Town.

T. junceum, *L*.—Very abundant on the shores.

Hordeum marinum, *L*.—Rare. Waste ground at New Grimsby, Tresco.

Lolium Italicum, *A. Beauv*.—In a clover-field near Heugh Town.

L. perenne, *L*.—Abundant, but it does not appear to be much cultivated in the pastures, which are, I believe, seldom longer than three years in grass.

Filices.*

Polypodium vulgare, *L*.—In many places in St. Mary's, Tresco, etc. Always very small, and by no means common.

Lastrea Filix-mas, *Presl*.—In St. Mary's Marshes.

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* Mr. Cooke, in North's 'Guide to the Scilly Isles,' remarks that these islands are especially rich in Ferns. My observations do not, by any means, confirm this view. Considering the dampness and mildness of the climate, I think it remarkable how very scarce and local the few Ferns are which do occur; with the exception of *Pteris aquilina* and *Asplenium marinum*, both of which are very abundant. *Asplenium lanceolatum*, Huds., abundant in the Channel Islands and in Cornwall, is here almost or altogether absent. Cooke says he noticed a *single specimen*. He also gives *Lastrea æmula*, Brack., having noticed it in one situation only.

L. spinulosa, *Presl.*—Withy-bed east of Tresco Pool.

L. dilatata, *Presl.*—Common in St. Mary's Marshes; Tresco, near the Pool.

Athyrium Filix-fœmina, *Roth.* — Common in St. Mary's Marshes; also in Tresco.

Asplenium marinum, *L.*—Most abundant on the rocks and walls, and in the wells, throughout all the islands.

A. Adiantum-nigrum, *L.*— Occasionally; near Heugh Town, on the wall opposite to where *Scrophularia Scorodonia* occurs; walls leading from Holy Vale to Heugh Town, etc.

Scolopendrium vulgare, *Sym.*—Bank near Old Town Marsh.

Pteris aquilina, *L.*—Very abundant, covering the slopes in all the islands.

Osmunda regalis, *L.*—Abundant in Heugh Town and Old Town Marshes, also west of Tresco Pool.

Ophioglossum vulgatum, *L.*, β. ambiguum, *Coss. and Germ.* ('Flore des Environs de Paris,' ed. 2, p. 577).—This, which I at first referred to *O. Lusitanicum*, L., occurs most abundantly on the heights of St. Agnes, to the north-east, and to within a short distance of the shore. The following characters are from fresh specimens :—

Plant from 1–2½ inches high. Barren frond ovate or ovate-lanceolate, attenuate below, channelled, recurved; fertile frond with 12–20 spore-cases. Rhizome extensively creeping; two fertile fronds often springing from the same corm. Spores minutely tubercular.

The plant creeps very extensively, and the fronds thickly stud the ground. In one place I counted as many as 102 fronds in a square foot. It grows in very barren and exposed damp sandy ground, with a substratum of decomposed granite. Fruiting in June.

ON AN OPENING IN SOME LEGUMES.

By A. H. Church, Esq., F.C.S.

In some experiments recently made to determine the amount of water contained in the ripe seeds of *Faba vulgaris*, a phenomenon of peculiar interest was noticed. A number of the pods of this plant were examined at various stages of growth. It was found that the perfectly mature pod lost weight previous to dehiscence, and that this loss was due in part to the evaporation of water from the seed. Further experiments showed, in fact, that the ripe seeds might lose, even in the pod, one-third as much water as similar seeds lost when removed from the pod and exposed to the air for the same time. This loss of water is of course accompanied by a corresponding decrease in bulk, so that the seeds which when first ripe filled up almost entirely the cavity of the

pod, became soon so considerably reduced in size as to leave a large air-space. I at first imagined that the water was lost by transpiration through the pod itself, but closer scrutiny revealed another agency. In the *Faba vulgaris*, when the seed is mature, a small oval opening appears close to the proximal extremity of the ventral suture of the pod (*vide* Fig. 1). Through this opening evaporation of water from the seeds takes place without necessitating the dehiscence of the pod and the shedding of the seeds.

Fig. 1.

It becomes a matter of interest to ascertain whether a similar opening occurs in other legumes. The pod of some varieties of *Phaseolus vulgaris* showed traces only of such an opening; but in *Phaseolus pisiformis*, a Senegal species, a minute orifice occurs (*vide* Fig. 2). A remarkable approach to this arrangement is seen in *Diphysa Carthaginiensis*, Jacq. In the pod of this plant the vascular tissue immediately on leaving the peduncle on the ventral aspect, separates into two bundles, and interposed between them lies a tract of cellular tissue, indicating the site of a possible opening (*vide* Fig. 3). But in a species of Acacia, from Panama, the

Fig. 2.

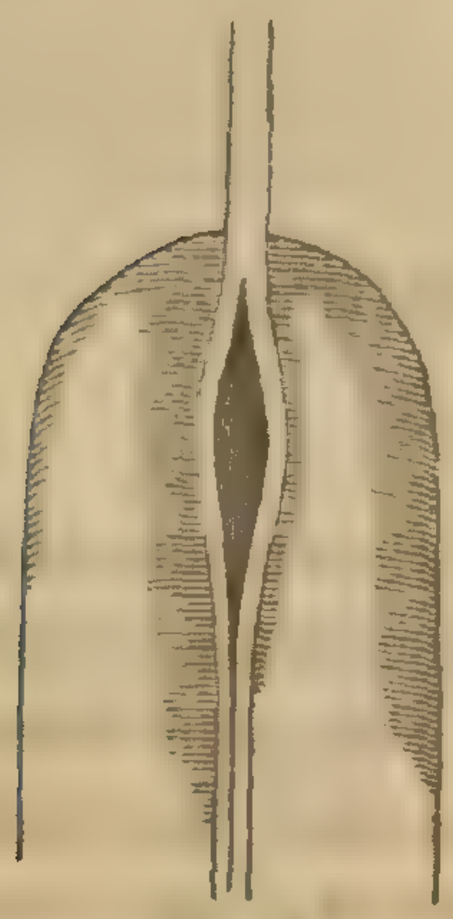

Fig. 3.

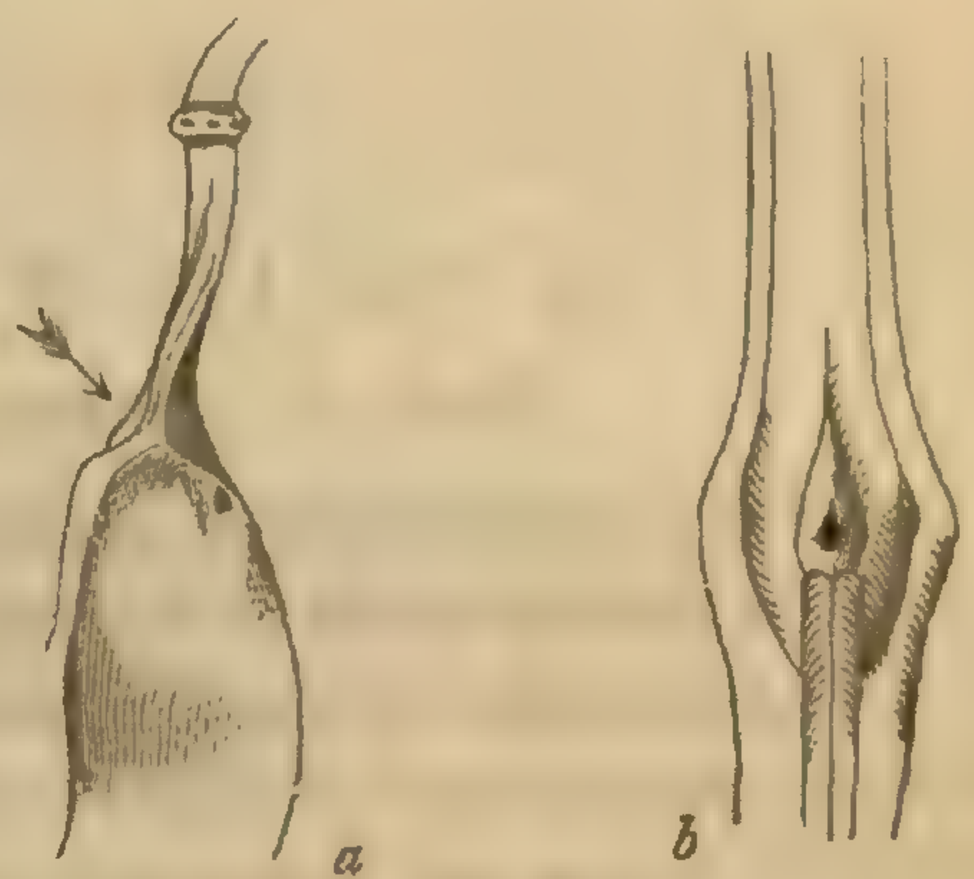

Fig. 4.

opening is remarkably distinct (*vide* Fig. 4). In some of the specimens of the pod of this plant (possibly *A. concinna*) insects, finding this natural opening the easiest point of attack, had enlarged it to make their way into the pod. Fig. 4 *b* is a front view of the opening magnified.

The functions of this orifice remain to be more exactly determined; while its value as a botanical characteristic is still unknown. I hope in the summer to pursue the inquiry further: the examination of numerous fresh specimens at and near maturity is necessary. I venture to suggest the term 'aëropyle,' for the opening to which I have drawn attention.

R. A. College, Cirencester.

SOME OBSERVATIONS ON THE MOSS KNOWN TO BRITISH BRYOLOGISTS AS *HYPNUM PRATENSE*.

By William Mitten, Esq., A.S.L.

This Moss, although noticed by Turner as a distinct species, remained neglected in Mr. Borrer's herbarium for forty years, until the specimens were re-examined by Spruce, who identified it with specimens he received from Bruch as *Hypnum pratense*, Koch. This name appears first in Bridel, ii. p. 769, who merely says of it, that the specimen in De Candolle's herbarium appeared to him to be only a poor state of *H. Schreberi*. In C. Mueller's 'Synopsis,' ii. p. 293, *H. pratense* is referred to *H. curvifolium*, Hedw. The species appears first described as distinct by Spruce in the Lond. Journ. of Botany, 1845. In the 'Bryologia Britannica,' p. 399, two states are noticed, the var. *α* being considered identical with the specimens in Drummond's 'Musci Americani,' no. 196 (*H. amœnum*), and stated to be common in the Pyrenees, and to have been found in Sussex by Mr. Borrer, and the var. *β*, with less compressed foliage, found in the North of England and elsewhere. In Schimper's 'Synopsis,' p. 628, *H. pratense* is fully described, having been previously figured in the 'Bryologia Europæa,' t. 611; the var. *α* being said to grow in marshy fields, and the var. *β*, with narrower leaves, all falcate secund, is stated to occur in Prussia, Silesia, and Britain. In the Oefers of K. Vet. Akad. Förh. 1861, no. 8, M. Lindberg first clearly defined the distinctions between the two species hitherto confused in the descriptions of *H. pratense*, and retained for *H. pratense* the species figured in the 'Bryologia Europæa,' and distributed in Schimper's 'Stirpes Normales;' and gave to the species he considered new the name *H. arcuatum* with a careful description, and it is to this species that all the British specimens appear

referable; but so difficult is it to invent a new name applicable to a species of *Hypnum* with falcate leaves, there was already published by Sullivant, in 1854, in the Proceedings of the American Academy of Arts and Sciences, vol. iii., a *H. arcuatum*, from the Pacific Islands, and a change of name being again unavoidable, it is here proposed to give the species the name *H. Lindbergii*. It differs from *H. pratense*, Bry. Europ., in the following particulars:—

Stems sparingly branched in an irregular manner, without any appearance of becoming pinnate, the leaves loosely compressed, ovate or ovate-lanceolate, acute, but with a broad point; the margins entire, the cells at the angles enlarged and pale, the capsule according to Lindberg is on a rather thick seta an inch long, turgid, ovate, when dry, plicate.

It grows in damp, sandy ground, among thin grass, and not in bogs; it is found in many parts of Britain, being not rare in Sussex, by road-sides on sandy soils. The fruit has been gathered but once in Western Prussia, by Dr. von Klinggräff, in June, at Wiszniewo. In a barren state it was gathered in the Pyrenees by Spruce, and was distributed by Schleicher as *H. circinatum*.

H. pratense, Bry. Europ., differs from the above, in its irregularly pinnate stems, more compressed foliage, leaves lanceolate, with a narrow point, denticulate at the apex, and the enlarged cells in the angles of the leaf of the same colour.

This moss is found, according to the label on the specimen, in the 'Stirpes Normales,' 'in *pratis humidis*, Vogesi et Alp. Helvet.', but in the 'Synopsis,' M. Schimper, says that he, with Hampe, had gathered it in the Black Forest. To this, also, belong the American specimens collected by Drummond in Canada, and by Sullivant and Watson in the United States. It would appear that this species is to be sought for in bogs, it certainly grows with *Philonotis forstana*, Brid., and may be expected to occur in Britain.

CORRESPONDENCE.

Woodsia glabella *in Norway*.

I found *Woodsia glabella* in Tromsdale, Norway, in 1860. (See 'Phytologist,' 1862, p. 31.) The announcement of its discovery in the Tyrol and Carinthia in No. 14 of the 'Journal of Botany,' page 56, shows that it has a wide range in Europe. Tromsdale is a valley on the mainland opposite to the

town of Tromso, and between 69° and 70° north latitude. The *Woodsia* was found not far below a permanent snow-patch on the north side of the valley, and at an elevation of perhaps 1000 feet above the sea level. *Cystopteris alpina* and *Asplenium viride* were growing near it. We may now expect to find this little Fern in places in Europe lying between these widely-separated localities.

York. JAMES BACKHOUSE.

Horticultural Society's Prizes for County Herbaria.

I am surprised to see the prizes proposed by the Horticultural Society published without comment in the 'Journal of Botany.' It seems to be properly the object of this Journal to defend the rare plants of Britain, not to help in their extirpation. The high cultivation, now so general in England, has very much restricted the localities of not a few of the rarest and botanically most interesting species, and now the heads of the Horticultural Society are offering premiums, which must tend to their almost certain disappearance. When a rare plant is confined, as is not unfrequently the case, to a single small spot in a county, what can be expected but its utter destruction, when a lot of unscrupulous prize-seekers are let loose upon it. Experience shows that prizes for sets of specimens does not advance scientific botany, and that they are of no scientific use. But even if they were of use, scientific botany is not the business of the Horticultural Society. The plants for which I have such fears are not the ornamental and attractive, but such as possess a purely scientific interest, and would be discarded at once by a mere gardener. Of such as these the prize-candidates will make up their lists of species, and by so doing will deprive all future botanists of the pleasure of gathering little bits of rare plants in their native localities.

C. C. BABINGTON.

Cambridge.

Genera of Hepaticæ.

(Extract from a letter of Dr. Pfeiffer to Dr. J. E. Gray.)

Cassel, Feb. 11, 1864.

I am occupied in the study of botanical literature and systematology. I was agreeably surprised by learning (Ann. of Nat. Hist. viii. 1861, p. 405) that you are the veritable author of the systematical part of that excellent work, 'Arrangement of British Plants,'—a work nearly unknown to Continental writers, though it contains the true basis of many modern views. For instance, you are the first founder of the system of Hepaticæ now generally adopted, although your names are never quoted, not even in the works of the learned Nees. Having procured your work by the help of Mr. Cuming, I intend making it known to German writers, and vindicating the priority of your names for most of the modern genera of Hepaticæ named by Dumortier and by Nees. Only several genera of Raddi have priority over yours. In other families some of your genera are quoted; for instance, by De Candolle in Centaurea, and

by Endlicher among the Algæ, and several others are, in spite of their evident priority, quoted in the synonymy of genera which are described posteriorly, and now adopted. I think it a duty to reclaim these priorities.

L. Pfeiffer.

On the Retention of Subgeneric Names.

I always feel regret when I cannot agree with Professor Babington on any botanical subject; but I cannot allow his observations "On the Law of Priority in Nomenclature," in the last number, to pass without remark. The law which he quotes from De Candolle does not at all bear him out in his conclusions. De Candolle undoubtedly says that "in the division of a genus, the groups which no longer bear the old generic name ought, if these groups were considered as genera by the ancient botanists, to retain their ancient name;" and he then proceeds to lay down rules applicable to those cases "in which those groups have never been considered as genera," but which rules have no direct bearing upon the present question. Their gist, however, is contained in the concluding sentence, in which he maintains that "it is only when none of the species of the new genus bears a substantive name, or when such substantive names have been already employed for another genus, that the creation of a new name is allowable." He says nothing directly of the case of names considered by their authors as subgeneric; but the natural conclusion, both from analogy of reasoning and from his practice is, that he would treat such names exactly as if they had been originally called generic, or as if they had been employed as the substantive names of species, and retain them for the new genus.*

And this rule is perfectly consistent with justice and common sense. Both genera and subgenera are mere collections (more or less natural or artificial) of species for systematic purposes, and it depends entirely upon the extent to which individual naturalists are inclined to subdivide or to mass the species, whether they designate them as one or the other. It requires as thorough a knowledge of the subject to form and characterize a subgenus (so called) as a genus; or, I should rather say, that properly to separate the smaller subdivisions indicates a more complete examination than that by which an extensive genus is often founded on the examination of a few or even perhaps of a single type. It would therefore be a manifest injustice to the naturalist whose time and talents have been so employed, to reject the name which he has given to a section, and thus to consign his labours to obscurity, on the mere ground that he attached a different systematic value to the group from that which we ourselves believe to be its due. It would also be a distinct encouragement to the mischievous practice of overburdening science with a plurality of synonyms, which become perfectly gratuitous obstacles in the way of the student.

Again, the practice of adopting subgeneric names as generic is almost univer-

* De Candolle's rules are in effect the same as those of Linnæus, which are as follows:—"Nomina generica, quamdiu synonyma digna in promptu sunt, nova non effingenda." "Antiquum si dirimetur genus in plura, consultum est nova non effingere nomina generica, quamdiu digna in phalange synonymorum specierum supersint." (Linnæus, 'Philosophia Botanica,' ed. Willdenow, p. 200.)

sal among botanists as well as zoologists; and De Candolle especially has evinced throughout his works the strongest desire to do justice to his predecessors in this respect. The same practice is followed by Endlicher and by Bentham and Hooker; in fact, it is all but universal. As a conspicuous example of the practice of zoologists, I may be allowed to quote the case of Cuvier. In his 'Traité Élémentaire,' and subsequently in his 'Règne Animal' he for the most part adopted the Linnæan genera, breaking them up into sections, to which he gave names, and these sections having been adopted by subsequent authors as genera, his names have been used as generic; and even when they were given (as they frequently were) in French, the name has been translated into Latin, and the credit of it given (and justly given) to Cuvier, as the originator of the genus.

In fact, the simple justice of preserving the name first given to a subdivision as the permanent designation of the group, in whatever light it may be viewed, whether as sectional, subgeneric, or generic, appears to me so clear, that I can only regard it as carrying out in natural history the universal moral precept which commands us "to do unto others as we would they should do unto us." I need hardly say, therefore, that I concur with Mr. Syme in preferring the earlier name *Spergularia* to the later *Lepigonum*.

J. E. Gray.

British Museum.

BOTANICAL NEWS.

Mr. William Thiselton Dyer, from King's College, London, has been elected to the Physical Science Studentship at Christ Church, Oxford.

Dr. Rostau's Piedmontese plants will not be ready for distribution before the end of the summer. J. T. Boswell Syme, Esq., 70, Adelaide Road, Haverstock Hill, N., will take the charge of their distribution in England.

Botanical Society of Edinburgh.—*December* 10.—Professor Balfour in the chair. The following communications were read:—1. Notice of the Occurrence of *Polypodium calcareum*, near Aberdeen. By Mr. James Robertson. 2. Account of the Vegetation of the Cliffs at Kilkee, county Clare, Ireland. By N. B. Ward, Esq. Kilkee is exposed to the full influence of the Atlantic winds and waves, and thus a rock two hundred feet above high water is so copiously supplied with saline spray, as to afford sustenance to a colony of periwinkles which fringe its summit. Owing to the same influences, the summits of the cliffs, varying in height from a hundred and fifty to four hundred feet, are coated chiefly with marine plants, some of which grow in a very stunted form, but all of them illustrate in a striking way the important physiological law that, if plants can do nothing else, they must produce their flower and fruit. Thus we find here a number of plants simulating the appearance of the inhabitants of alpine regions. Mr. Ward then gave a list of all the plants collected, and noticed the discovery of a *Fucus*, which was figured in Plate XII. of the 'Journal of Botany.' 3. Remarks on the Sexual Change in the Inflorescence of *Zea Mays*. By Mr. John Scott. After noticing the unisexual characteristics

of the inflorescence of the Maize, the author illustrated several changes from the normal sexual characteristics of the florets. The male panicles, for example, were shown to produce, along with their own kind of florets, perfect female florets, imperfect and intermediate male and female florets, as well as structurally hermaphrodite florets. Similar changes were also illustrated in the female spikes. 4. Remarks on some of the Economical Plants of India. By Dr. Hugh Cleghorn. Dr. Cleghorn noticed the Box, the Olive, the Bamboo, and *Urtica heterophylla*, and mentioned their uses. 5. On the Cultivation of the Quiniferous Chinchona in British Sikkim. By Dr. Thomas Anderson, Calcutta. The cultivation of Chinchona at Darjeeling has been carried on successfully. The following is a return of the plants in the nurseries at that place on the 15th of June, 1863:—*C. succirubra*, 1024; *C. Calisaya*, 53; *C. officinalis*, 573; *C. micrantha*, 695; *C. Peruviana*, 2275; total, 4620. The cultivation of Chinchonas at Darjeeling was at first attended with great difficulties, but these have now been overcome. 6. On the Cultivation of Tea in India. By William Jameson, Esq., Surgeon-Major, Saharunpore. Mr. Jameson gave an account of the tea-plantations in the Kohistan of the North-West Provinces of India. In a former communication he estimated the quantity of waste and other lands fitted for cultivation with tea throughout the Kohistan of the North-Western Provinces and Punjaub and Dhoons, and showed that by them the enormous quantity of 885,000,000lb. might be there raised. But in this estimate he excluded the Kohistan of Huzarah and Rawul Pindee, of Cashmere Jummoo and the protected Sikh States. The following estimate, 930,000,000, of the yield of the British territory is more near the mark, and, as a general return when in full bearing, 100lb. per acre may be given,—a quantity equal to the whole export trade of China, and with high cultivation the figures might easily be doubled, and thus not only allow an immense quantity for the consumption of the Indian community, but at the same time afford a supply for export to other countries. Tea cultivation in the North-Western Provinces is no longer an expertment. It has been proved by data which cannot be gainsaid, that it can be profitably conducted; that the tea prepared is admirably fitted for the home and Indian markets; and that, if properly backed by capital, the undertaking presents a safe and profitable investment. 7. Notice of the occurrence of *Sagina nivalis*, Lindl., on Ben Lawers, Perthshire. By Professor Balfour. (Journ. of Bot. Vol. I. p. 355.)

Botanical Society of Edinburgh.—*Jan.* 14.—1. New Researches in Hybridity in Plants. By M. Ch. Naudin. No. I. 2. Letter from Robert Brown, Botanist to the British Columbia Association. Mr. Brown has visited the interior of the country, and has also reached the head of the great central lake of Vancouver's Island. From the Upper Fraser he obtained a quantity of seed of a fine pasture grass, which survives all winter, and which he expects will be well suited for the Hebrides and the Orkney and Shetland Islands. Among the interesting additions to his collections he mentions three new species of *Juniperus*, a large new *Taxus*, *Cupressus Nutkanus*, *Thuja Craigana*, a new *Pinus*, a fine new *Oreodaphne*, etc. 3. Letters from William Milne, Old Calabar. Mr. Milne thus describes the leading characteristics of the district where he is:—"There are five species of *Melastoma*, six of *Dracæna*, five of

Amomum, and several belonging to *Zingiberaceæ*. There are a number of species belonging to *Scrophulariaceæ*, and amongst them is a *Digitalis*, which is scattered over all waste ground. *Euphorbiaceæ* and *Cucurbitaceæ* are both extensive Orders here. Three species of *Amaryllis* are abundant,—one in the river, and the other two spread all over the plantations. Solanaceous plants are numerous; there are two kinds sold in the market as purgatives and for bathing the sides of the face when there is a discharge from the ears. *Anonaceæ* is another extensive Order. According to the Rev. Mr. Thomson there are sixteen or eighteen kinds. I have collected a number of *Bignoniaceæ* and *Chinchonaceæ*. I have also met with eight or nine species of *Convolvulus*, but there are more. Among the *Labiatæ* is a large species of *Salvia*, used as a medicine. There are also three true Mints, which are used for seasoning. A *Nymphæa* is frequent in the inland streams. I think there are from eighteen to twenty-four distinct Orchids; one fine terrestrial species has a flowering stem six feet or seven feet high. There are two fine species of *Strophanthus*. One true *Verbena* and two species of *Clerodendron* are abundant. I have also observed two species of *Amaranthus*. Both are used as vegetables in Calabar chop. One *Pentstemon* is found by the margin of a small stresm at Ikorofiong, but not plentiful. A *Phytolacca* and a *Polygonum* also occur at the same place. I have collected a *Loranthus* on trees by the banks of the river. Two species of *Lonicera* are very common. Leguminous plants are very numerous; amongst them is a sensitive *Mimosa*. The Poison Bean (*Physostigma*) is often used for deadly purposes; one species is largely cultivated for putting into the streams to poison the fish, and another is sold in the markets for Calabar chop. One of them is very like our Scarlet Runner; the ripe pods are from six inches to eight inches long, and the fruit is beautifully spotted. *Compositæ* are not so numerous as might be expected; however, there is a due proportion. A *Tillandsia* climbs up the Palm-trees. There is one fine species of *Calophyllum* and a tree belonging to *Myrtaceæ;* also an *Aristolochia*, probably *A. gigantea*. There are five Palms. One large species of *Juncus* is abundant on the sides of the river at Creek Town, with another smaller species. There are several *Cyperaceæ* by the river, and amongst the lowland plantations there are a number of *Gramineæ* sprinkled about. Eighteen varieties of Yams and six varieties of *Colocasia* are cultivated; the flowering stems of the latter, with spathe and spadix, are sold in the markets for putting into Calabar chop; the corms are also boiled, and used by the natives. There are two kinds of *Cassava* largely cultivated. One true *Banana* with very small fruit, and eight different Plantains are sold in the markets. The fruit of a cultivated Malvaceous plant is cut up into slices and put into soups. There are also two species of *Agaricus* sold in the markets, which are said to be very nourishing, and to give a fine flavour to Calabar chop. The larger kind is also put into rum, as it is of an intoxicating nature."

4. Letter from Dr. Meredith, Demerara, giving an account of a visit to the native habitat of the *Victoria regia*. 5. Mosses found near Blair Athole. By Miss M'Inroy, of Ludi. 6. Plants of the Sutlej Valley, Kullu, and Kangra. By Dr. Hugh F. C. Cleghorn. 7. Professor Balfour read an account of an extraordinary growth of *Merulius lacrymans* below the wooden floor of a cottage at Arthurstone, in Strathmore.

W. Fitch, del. et lith.

Vincent Brooks, Imp.

Asplenium Adiantum-nigrum-obtusum
A. Serpentini Zeusch.

ON THE *ASPLENIUM ADIANTUM-NIGRUM*, *var.* *OBTUSUM* (*SERPENTINI*), AS A BRITISH PLANT.

By Thomas Moore, F.L.S., F.R.H.S.

(Plate XVII.)

Since the time of Willdenow, the existence in Europe of an *Asplenium* somewhat intermediate in character and aspect between *A. Adiantum-nigrum* and *A. montanum*, has been known. This Fern was called *A. obtusum* by Willdenow himself, *A. Forsteri* by Sadler, and *A. Serpentini* by Tausch, but is now considered as a form or subspecies referable to *A. Adiantum-nigrum*, including a goodly array of synonyms besides those just mentioned. In the 'Index Filicum' the name of *A. Adiantum-nigrum*, γ. *obtusum*, is employed; but some authors, as Heufler and Milde, prefer that of *A. A.-Serpentini* or *A. A.-serpentinum*.

This *Asplenium Serpentini* belongs to the triangular, tripinnate series of Aspleniums, and though varying much in the size and breadth of its parts, is rather small-pinnuled in its most marked and characteristic states. It has the pinnæ straight and spreading, as compared with those of the variety or subspecies *acutum*, in which they are connivent; and from the more typical forms of *Adiantum-nigrum*, which have the base of the segments incurved, it differs, according to Heufler, in having the base of the segments recurvate. In some of its forms the segments are blunt and firm, in others blunt and of thinner texture, and in others again more or less acute even; but those forms which are narrow and obtuse, thus acquiring a wedge-shaped outline, are often acutely toothed at the apex. In outline, the pinnules vary from ovate-obtuse to ovate-acute or even almost acuminate, the segments in the former case having a short broad-ovate or ovate-oblong figure, and in the latter approaching more or less nearly to linear, but without any of the peculiar features of *acutum*, in which the segments are more strictly linear. The surface is of a dull opaque green, not lucid, as in *acutum*, and the fructification is crowded and generally becomes confluent.

Till recently, this plant was chiefly known as a native of Croatia, Dalmatia, Hungary, Bohemia, and Saxony, extending to Italy and probably also to South Africa and Abyssinia. The name *Serpentini* was given to it from its being found on serpentine rocks. When, there-

fore, some two years since, Mr. A. Christie sent me from the serpentine range dividing the counties of Aberdeen and Banff, a small-pinnuled form of the common black Maidenhair, I was quite prepared to expect that this interesting Fern might be yet added to our flora. And this expectation was soon realized, for very shortly after Mr. Christie, who had renewed his researches, sent me specimens of the true plant undistinguishable from authentic examples for which I am indebted to the kindness of Professor Braun and Dr. Sturm. The fact of the discovery of *Asplenium Serpentini* as a British plant was recorded in the early part of last year (Vol. I. p. 184), the genuine specimens having been gathered in the autumn of 1862; and it only remains to add, that it is from fronds collected in 1863 that the figure accompanying this notice has been prepared.

SYNOPSIS OF THE PHANEROGAMIC FLORA OF SPITZBERGEN.*

By A. J. Malmgren.

The earliest account of the vegetation of Spitzbergen is that of Martens, who published his 'Spitzbergische Reisebeschreibung' in 1675; besides descriptions, he gives drawings, badly executed, though easily recognized, of eleven of its most common flowering-plants.†

In 1774,‡ Solander, in Phipps's 'Voyage towards the North Pole, 1773,' published some notes on the flora of Spitzbergen. He enumerates 12 species of Phanerogamia and 15 of Cryptogamia, 2 of which were new to science, viz. *Agrostis algida* and *Ranunculus sulphureus*. When Wahlenberg published his 'Flora Lapponica' in 1812,

* From Ofvers. af K. Vet. Akad. Forh. 1862, pp. 229–268. The editor is indebted to Miss Emilie Böckelman for the translation of this valuable paper, and to Professor Otto Torell, of Lund, for the addition of two species, *Ranunculus Lapponicus* and *Kœnigia Islandica*, to the flora. They are inserted in their places.

† These are: *Ranunculus sulphureus*, Sol.; *R. pygmæus*, Wbg.; *Cochlearia fenestrata*, R. Br. (*anglica*, Smflt., etc.); *Cerastium alpinum*, L.; *Potentilla emarginata*, Pursh; *Saxifraga oppositifolia*, L.; *S. rivularis*, L.; *S. nivalis*, L.; *S. foliolosa*, R. Br.; *Polygonum viviparum*, L.; *Salix polaris*, Wbg. He also mentions *Papaver* and *Oxyria*.

‡ Spitzbergen was indeed visited in 1758 by Martin, a Swede, but as far as I know, he did not publish any additional information on the flora of these islands.

Martens and Solander were the only authorities for the Spitzbergen flora. In 1820, R. Brown, in the appendix to Scoresby's 'Account of the Arctic Regions,' published a catalogue of the plants brought by Scoresby from Spitzbergen, which contained 30 species of Cryptogamia and 14 of Phanerogamia. In the Transactions of the Linnean Society of London, vol. xiv. pp. 360–394, W. J. Hooker, in an account of the arctic plants collected by E. Sabine in 1823, records 24 species of Phanerogamia and 2 of Cryptogamia. Five years later, in 1828, the same author published, in an appendix to Parry's 'Narrative of an Attempt to Reach the North Pole, 1827,' a list of the plants collected by that navigator on the most northern coasts and in the small islands of Spitzbergen. This list contains 40 species of Phanerogamia and 50 of Cryptogamia, gathered about lat. 80° N., and accurately records their habitats. It is remarkable that this catalogue has been quite overlooked by the later writers on Spitzbergen.

Chr. Sommerfelt published in the 'Magazin for Naturvidenskaberne,' Christiania, 1833, a paper on the flora of Spitzbergen and Bear Island, from plants collected by Keilhau, which is interesting, as it gives an idea, though faint and incomplete, of the vegetation of the southern coast of Spitzbergen and Stans Foreland,—hitherto all knowledge of the flora having been almost confined to the northern part of the island.

C. Martins, a member of the French Northern Expedition, gives a list of the plants he found, in 1839, at Bellsund and Magdalena Bay, in a note to his Glaciers of Spitzbergen, published in the Biblioth. Univers. de Genève, vol. xxviii. p. 139. He enumerates 57 species; 55 are from Bellsund and 24 from Magdalena Bay. Dr. J. Vahl, another member of the same expedition, communicated a list of the plants he collected to Alexis Lindblom, of Lund, who, from it and the published lists of Phipps, Scoresby, Sabine, and Keilhau, prepared a Flora of Spitzbergen and Bear Island, which was published in his 'Botaniska Notiser' for 1839–40, pp. 153–158. A second edition of this was published in the 'Flora,' 1842, pp. 481–493, by Dr. Beilschmied, who added some new species; but neither author was acquainted with the list in Parry's Narrative. The number of plants given by them is also erroneous, as they have entered many synonyms as separate species. Thus *Cochlearia fenestrata*, so common in Spitzbergen, has no less than five names, *Luzula hyperborea* three, *Stellaria Edwardsii* and *Alsine biflora* two, and so on. Furthermore,

the lists contain several plants which certainly have been erroneously determined, as *Salix herbacea*, *Saxifraga Sibirica*, *Tillæa aquatica*, etc., and others which have never been found in Spitzbergen, as the *Kœnigia Islandica*, and also *Calamagrostis stricta*, which was first found at Isfjord, in September, 1861. Several species also are given with a ?, and one can only conjecture what is meant by many others, as *Alsinella stricta ?*, Smflt., *A. arctica*, Smflt., *Holcus arcticus*, Smflt., *Cerastium vulgatum*, Smflt., *Draba Martensiana*, J. Gay, etc.

It seems to me necessary to give a list of those plants which have been erroneously or doubtfully included in the Spitzbergen flora, and to add such corrections and notes as I am able, for they cannot be admitted into a critical catalogue.

Ranunculus cuneatus, Western Spitzbergen, *Smflt.*, is not in the herbarium of Keilhau.*

Draba algida, *Smflt.*, is *D. alpina* (L.), Hook.

D. oxycarpa, *Smflt.*, is probably a form of *D. alpina*.

D. Martensiana, *J. Gay*, unknown to me.

D. oblongata, *Smflt.*, from Stans Foreland; Keilhau's plant is *D. micropetala*, Hook.

Cochlearia officinalis, *Smflt.*, *Vahl* and *C. Martins*, is *C. fenestrata*, R. Br. (f. typica), with rounded, oval pods.

C. anglica, *Smflt.*, is *C. fenestrata*, v. *prostrata*.

C. Danica, *Sol.*, *Hooker*, *Vahl* and *Martins*, is *C. fenestrata*, v. *prostrata*.

C. Grœnlandica, *Sol.* and *R. Br.*, is *C. fenestrata*, v. *prostrata*.

Spergula saginoides, *Vahl* and *Martins*, is *Sagina nivalis* (Lindbl.), Fr.

Alsine Scandinavica, *Martins*, is *A. biflora*, L.

Alsinella stricta?, *Smflt.*, from Sydkap, is possibly luxuriant *Sagina nivalis*, Fr.

A. arctica, *Smflt.* Keilhau's plant is a tender form of *Alsine rubella*, Wbg.

Arenaria ciliata, *v.* Norvegica, *Vahl* and *Martins*, is *A. ciliata*, L.

Cerastium vulgatum, *Smflt.*, from Sydkap. Keilhau's plant shows this to be, as I had already concluded, *C. alpinum*, v. *cæspitosum*, Mgrn.

Potentilla Keilhaui, *Smflt.*, is *P. pulchella*, R. Br.

Saxifraga Sibirica ?, *Smflt.* "Not in the herbarium," wrote Professor Blytt. It is doubtless a luxuriant *S. cernua*, L., which has grown in small tufts, in places sheltered from the wind.

Erigeron pulchellus, *v.* Unalaschkensis, *Vahl*, is *E. uniflorus*, L. (=*E. eriocephalus*, Vahl, Fl. D. 2299).

Tillæa aquatica, *Sol.*, is supposed by Lindblom to be *Kœnigia Islandica*, L., which, though found by Sabine on the eastern coast of Greenland, between

* The late Professor Blytt examined for me the herbarium of Keilhau, sending me notes on the Spitzbergen plants, and specimens of all the doubtful species.

lat. 72°–75° N., according to Hooker, has never been met with in Spitzbergen. *Kœnigia* must be therefore excluded.* What Solander meant by *Tillæa aquatica* it is not easy to determine. Perhaps he had *Stellaria humifusa* before him.†

Salix herbacea, *Sol.* and *W. J. Hooker*, in Parry, is certainly *S. polaris*, Wbg., which is very common and the only species of the genus on the northern coast. Parry must have brought specimens of this abundant and widely diffused *Salix*. I have myself found it at Heela Cove and Low Island, where Parry collected his specimens, but I never saw *S. herbacea*. Scoresby, Keilhau, Sabine, Vahl and Martins found only *S. polaris*, Wbg. In Solander's time, *S. polaris* was not distinguished as a species from *S. herbacea*, L.‡

Juncus campestris, *Sol.*, and Luzula campestris, *R. Br.*, belong, according to Brown himself (Suppl. to Append. Parry's First Voy. p. 283), to his *Luzula hyperborea*, and this is the same as *L. arcuata*, β, Wbg.

Carex lagopina ?, *Vahl*, is probably *C. glareosa*, Wbg.

C. heleonastes, *Martins*, probably *C. glareosa*, Wbg.

Calamagrostis stricta is given by Smflt. as from Bear Island, not from Spitzbergen, as Lindblom incorrectly states.

Holcus arcticus, *Smflt.*, is *Dupontia Fischeri*, R. Br.

Poa alpina, *Smflt.* and *Vahl*, belongs to *P. stricta*, Lindeb., according to Vahl's own specimens in the Riks Museum, Stockholm.§

P. laxa ?, *Hooker* and *Vahl*, is either *P. cenisia*, v. *arctica*, Br., or a form of *P. stricta*, Lindeb., a very variable species in Spitzbergen. *P. laxa*, Hænke, is not found in Spitzbergen.

Stellaria læta (*Rich.*), *Hook.* in Parry, is *S. longipes*, Goldie, according to Ledebour (Fl. Ross.). *S. Edwardsii* is referred also to this species by Ledebour and by J. D. Hooker, according to his specimens from Beechy Island, Arctic America, in the Riks Museum.

Omitting synonyms, and erroneous and doubtful names, which have made the flora of Spitzbergen unreliable and so useless, there remain only 67 species hitherto certainly known. To these I am able to add 26 additional species, 5 of which were first found by Torell, Nordenskiöld, and Quennerstedt, in 1858; the remaining 24 were discovered by the expedition of 1861. The new species are:—*Ranunculus hyperboreus*, Rottb., *R. arcticus*, Richards (*R. affinis*, v. *leiocarpa microcalyx*, Trautv.), *Arabis alpina*, L., *Draba glacialis*, Adams (non Smflt. Spitzb. Fl.), *D.*

* *Kœnigia* has been found by Torell on the west coast. See page 146.—Ed.

† Phipps's specimens in the Herbarium of the British Museum, named by Solander, are, as our author supposes, *Stellaria humifusa*, in a young state.—Ed.

‡ Phipps's specimens are *S. polaris*.—Ed.

§ The true *P. alpina*, L., I never saw in Spitzbergen, nor is it to be found in the collections from the west coast. The leaves of *P. stricta* resemble those of *P. alpina*, but the panicle and the small viviparous spikes oblige us to separate it.

pauciflora?, R. Br., *D. rupestris*, R. Br., *Wahlbergella affinis*, Fr., *Sagina nivalis*, Fr., *Arenaria Rossii*, R. Br., *Ammadenia peploides* (L.), Gm. (1858, Nordensk.), *Potentilla maculata*, Pourret, *Arnica alpina*, Murr., *Taraxacum palustre*, Sm., *Nardosmia frigida*, Cass. (1858, Nordensk.), *Polemonium pulchellum* (Bunge), Ledeb., *Mertensia maritima* (L.) (1858, O. Torell), *Luzula arctica*, Blytt, *Carex pulla*, Good. (1858, Nordensk.), *C. glareosa*, Wbg., *C. rupestris*, All., *C. nardina*, Fr., *Calamagrostis neglecta*, Ehrh., *Dupontia psilosantha*, Rupr. (1858, Nordensk.), *Poa Vahliana*, Liebm. Fl. D. fig. 2401, *Catabrosa vilfoides*, n. sp., *Festuca brevifolia*, R. Br. All these additions to the flora of Spitzbergen are from the western and northern coasts, from Ice Sound to Seven Island, 13 from the western coast, in lat. 78°–79·5° N., and 13 from the northern coast, in lat. 79·5°–80·5° N.

With these preliminary remarks I shall proceed, as concisely as possible, to notice the Phanerogamic flora of Spitzbergen. The principal source of my information has been the rich collections brought home by the Spitzbergen Expedition of 1861, now deposited in the Riks Museum, and the herbarium of Professor Nordenskiöld, collected in Spitzbergen, 1858. The remarks on the habitats, distribution, and time of flowering of the plants, are from my own observations made on the spot, and from memoranda in the rich herbarium of my friend Dr. Goës, which contains many new species from the western coast. I have used the older accounts as little as possible, and then only with the greatest precaution. Of the 6 species wanting in these collections, *Ranunculus glacialis*, *Eutrema Edwardsii*, *Empetrum nigrum*, and *Salix reticulata* were found only on the most southern coasts of Spitzbergen, which were not visited by the Expedition; *Parrya arctica* and *Hierochloa pauciflora* were found near Hecla Cove, in Parry's Expedition.

The localities referred to subsequently are:—

On the West Coast of Spitzbergen:

Sydkap	76° 30′	N. lat.
Bellsund	77° 30′	,,
Ice Sound and Advent Bay	78° 10′	,,
King's Bay	79°	,,
Cross Bay	79° 10′	,,
Magdalena Bay	79° 30′	,,
Kobbe Bay	79° 40′	,,
Amsterdam Island and Smerenburg	79° 45′	,,

On the Northern Coast:				
Norway Island	79° 50′ N. lat.,	11° 30′	E. long. from Greenwich.	
Rœde Bay	79° 50′	„	12° 18′	„
Wide Bay	79° 50′	„	15° 30′	„
Treurenburg Bay, Hecla Cove .	79° 56′	„	16° 50′	„
Lomme Bay	79° 40′	„	18°	„
On the North-east Side:				
Augusti Bay	79° 40′ N. lat.,		20°	„
Low Island	80° 20′	„	18° 30′	„
Brandywine Bay	80° 24′	„	19° 30′	„
Walden Island	80° 35′	„	19° 45′	„
Seven Island	80° 45′	„	21° 22′	„

DICOTYLEDONEÆ.

RANUNCULACEÆ, *Juss.*

1. *Ranunculus glacialis*, L.—Found by Keilhau on Sydkap, according to Sommerfelt, but not again in Spitzbergen. Keilhau's specimens belong to this species, according to Blytt.—Hooker found this among the plants brought from the eastern coast of Greenland, lat. 72°–76°, by Scoresby and Sabine, Linn. Trans. xiv. p. 362.

[1*. *R Lapponicus*, L.—On the west coast, O. Torell, 1858.]

2. *R. hyperboreus*, Rottb. Wbg. Fl. Lapp. p. 158.—Among wet moss, 50 ft. above the sea, on the northern shores of Brandywine Bay, lat. 80° 24′; it was passing out of flower when I found it on the 27th of July.

3. *R. pygmæus*, Wbg. Fl. Lapp. p. 157, t. 8, f. 1.—Pretty general along the western coast, as far as Amsterdam Island, under a bird-cliff (*fogelberg*), growing luxuriantly, being (September 1) 8 inches high and with ripe fruit. At Brandywine Bay, on the northern coast, flowering on the 27th July. This species grows often in tufts from 2 to 3 inches in diameter, and is found almost up to the snow-line. At Magdalena Bay it was gathered more than 100 ft. above the sea, with flowers and in fruit at the end of August.

4. *R. nivalis*, L. Wbg. Fl. L. p. 156.—Very rare on the western coast, in Ice Sound and in Magdalena Bay, in Hecla Cove, on the eastern side of Treurenburg Bay (Hooker, in Parry).

5. *R. sulphureus*, Sol. in Phipps; *R. nivalis*, var. *β. sulphureus*, Wbg., De Cand., Hooker, Ledeb., (non *R. frigidus*, Willd., qui est *R.*

altaicus, Laxm. sec. Ledeb. Fl. Ross.). A *R. nivali* differt *R. sulphureus* imprimis receptaculo fusco-hirsuto (in *R. nivali*, glabro), capitulis seminiferis fere globosis (in *R. nivali*, cylindricis), carpellis stylo attenuato erecto rostratis (in *R. nivali* rostro tenui horizontali munitis), foliis radicalibus suborbiculatis, margine multilobatis, basi cuneatis vel truncatis (in *R. nivali*, reniformibus, infra medium 5–7-partitis). *R. frigidus*, Willd. (=*R. altaicus*, Laxm.) *petalis obcordatis*, carpellis stylo subduplo longioribus a *R. sulphureo* differt.

Wahlenberg, Hooker, R. Brown, and others, have made this good species a variety of *R. nivalis*, L., but the characters I have given, which are constant, sufficiently separate it. And from *R. frigidus*, Willd., it is also evidently different.

General along all the coasts. On dry places, exposed to winds, it scarcely attains 2 inches in height, but under bird-cliffs, especially when they have a southern aspect, it gains a surprising development and luxuriance, reaching a height of 10–15 inches.

The earliest flowering specimens were found on the 6th of July, at Treurenburg Bay, on the north-eastern side, lat. 80°; on the 27th of July it was gathered with flowers and fruit, at Brandywine Bay, lat. 80° 24′, and was seen everywhere at the end of August with ripe seeds. —Parry gathered it on Walden Island; Nordenskiöld brought it from Seven Island, near 81° lat., and I saw it at Hinlopen Strait, 1000 ft. above the sea, near to the snow-line. The luxuriant specimens (1 foot high) which Dr. Goës brought from Norway Island, differ from the common forms in having "carpella fusco-hispidula," instead of "carpella glaberrima."

6. *R. arcticus*, Richardson, in Franklin's Narrative, p. 741; *R. affinis*, R. Br. var. α, Hook. Fl. B. Am. p. 12. t. 6. f. A. a; *R. affinis*, var. *leiocarpa*, f. *microcalyx*, Trautv. in Middendorff's Sibir. Reise, i. part 2, p. 62.—Near *R. auricomus*, f. *alpestris*, Hrtm., but distinguished by the channelled peduncles and smooth carpels, whose form and texture agree with Hooker's figure. Found at Cross Bay in flower and fruit on 10th August.

Papaveraceæ, *Juss.*

7. *Papaver nudicaule*, L.—One of the most general and hardy plants of Spitzbergen, found wherever the ground is free from eternal ice and snow, and thriving rather better in a soil free from organic consti-

tuents.—Walden Island, Parry; Seven Island, Nordenskiöld; and Brandywine Bay, lat. 80° 24′ N., 100 ft. above the sea; Torell saw it on the mountains, often near the snow-line, under lat. 80° N. The first flowers were seen 1st July, and on 31st July ripe seed-pods were found. Like most Spitzbergen plants, this continues to flower until the end of August.

Cruciferæ, *Juss.*

8. *Cardamine pratensis*, L.—Very scarce on the western coast up to Ice Sound, where it is found in September. Sydkap, Keilhau; Bellsund, Vahl and Ch. Martins.

9. *C. bellidifolia*, L.—Very general where the ground is free from snow in summer; luxuriant on the low islets of the northern coast and at Hinlopen Strait. Higher than 2–300 ft. above the sea, under lat. 80° N., it becomes more scarce, but was nevertheless found at Hinlopen Strait at an altitude of 800 ft.; Walden Island, Parry; Seven Island, Nordenskiöld.—It is in flower in the beginning of July, and has ripe pods at the end of the month.

10. *Arabis alpina*, L.—Magdalena Bay, 300 ft. above the sea.

11. *Parrya arctica*, R. Br., in Parry.—Hecla Cove, Parry. When I visited Hecla Cove at the end of June, the vegetation was so little advanced that this plant could not be found. Parry's Expedition remained all the summer there, leaving it only in the end of August.

12. *Eutrema Edwardsii*, R. Br.—Bellsund, Vahl and Ch. Martins.

13. *Braya purpurascens*, R. Br., Ledeb.; *B. glabella*, Richards., in Franklin's Narrative, p. 743; *B. arctica*, Hook. in Parry.—On sandy and gravelly ridges on the north and north-east coast. At Lomme Bay in flower and fruit, 23rd August, at Cross Bay in fruit 31st July, and at King's Bay on 15th August. Hecla Cove, Parry; and Bellsund, Vahl.

14. *Draba alpina*, L., Wbg., Hooker, Br.—Abundant along all the coasts and on all the islets. In flower at Treurenburg in the end of June. It varies greatly as to the size and shape of the pods, and also as to whether they are smooth, or more or less hairy.

15. *D. glacialis*, Adams, var. γ, Hook. Fl. B. Am. i. p. 51 (non *D. glacialis*, Smflt. Spitzb. Fl.).*—Augusti Bay, 600 ft. above the sea, in flower and fruit 5th August.

* *Draba glacialis*, Smflt., of which I have seen authentic specimens from Blytt,

16. *D. pauciflora ?*, R. Br.—Very general on the northern coast and at Hinlopen Strait, but very rare on the western coast, whence I have seen only one specimen from Ice Sound. In flower on the north-eastern side, lat. 80°, 7th July; with ripe pods at Brandywine Bay, 27th July. General at Augusti Bay, Treurenburg Bay, and Lomme Bay.

17. *D. micropetala ?*, Hook. in Parry; *D. oblongata*, Smflt. (Spitzb. Flora).—North-eastern side, lat. 80°, out of flower 7th July; Wide Bay, in flower, 12th; Brandywine Bay, in fruit, 27th July. According to W. J. Hooker, Sabine gathered this in Spitzbergen, probably on Norway Island, lat. 80°, where he had his observatory. It is not found on the west coast, but Keilhau got it on Stans Foreland.

18. *D. nivalis*, Liljebl.; *D. muricella*, Wbg. Fl. Dan. fig. 2417.—Scarce, as far as Brandywine Bay. In flower on the north-eastern side, lat. 80°, 7th, at Wide Bay 11th, and in fruit at Brandywine Bay 29th July. Found also at Cross Bay, Magdalena Bay, and Ice Sound.

19. *D. arctica*, Fl. Dan. 2294.—Hitherto gathered only at Bellsund by Vahl, and at Ice Sound by Nordenskiöld.

20. *D. corymbosa*, R. Br.; Fl. Dan. 2418.—Magdalena Bay and Bellsund, rare, Nordenskiöld.

21. *D. rupestris*, R. Br.; Fl. Dan. 2421.—West coast as far as Magdalena Bay, scarce.

22. *D. hirta*, L.; Fl. Dan. 2422.—More general than the preceding, to which intermediate forms seem to unite it. Found on the Norse Islands, at King's Bay, and Ice Sound.

23. *D. Wahlenbergii*, Hrtm.; Fl. Dan. 2420.—Here and there on the north and west coasts. Flowered in the first part of July at Treurenburg Bay, Wide Bay, and in the north-east. Found also at Lomme Bay, Cross Bay, King's Bay, Magdalena Bay, Ice Sound, and Bellsund.*

24. *Cochlearia fenestrata*, R. Br. in Parry.

Cochleariæ Anglicæ proxima species et vix distincta.

Var. *a. typica*. Spithamæa vel pedalis, erecta, foliis radicalibus reniformi-cordatis cito deciduis, caulinis spathulato-oblongis subdentatis, infimis petiolatis, siliculis subvenosis ovato-ovalibus rarius subglobosis.

is pretty general in Spitzbergen; it is peculiar, probably a new species, near *D. repens*, Bieb.?

* *Draba incana*, L., is given as a Spitzbergen plant by Dr. J. D. Hooker, in his important memoir on the 'Distribution of Arctic Plants,' Linn. Trans. xxiii. p. 285, London, 1861.—Ed.

—Under the bird-cliffs as far as Brandywine Bay, very common. The pods are sometimes nearly spherical. This form has been taken for *C. officinalis* by Sommerfelt and Vahl.

Var. *β. prostrata*. Minor, 1–3-pollicaris, procumbens, foliis radicalibus ovatis basi truncatis vel cordatis vel in petiolum decurrentibus, integerrimis vel basi utrinque unidentatis, caulinis sessilibus oblongis subintegris, siliculis ovati-ellipticis subvenosis.—This variety is the *C. Danica* of Solander, Hooker, Vahl, and others; it is also the *C. grœnlandica* of Solander, according to specimens in the Riks Museum. Martin brought it from Spitzbergen in 1758. It is very general on all the coasts and islets.

Var. γ. *lævigata*. Siliculis angustioribus elliptico-lanceolatis, subaveniis a var. *prostrata* differt.—On sand near the shore, scarce along the north and west.

I have found transition forms between all these varieties. I have consequently reduced to a single species the five hitherto recorded as from Spitzbergen. *C. officinalis*, L., Smflt. and Vahl, belongs to var. *typica*; *C. Danica*, Solander, Hooker, and Vahl, is var. *prostrata*, as is also Solander's *C. grœnlandica*; *C. Anglica*, R. Br. and Smflt., is a transition form between var. *typica* and var. *prostrata*. I have retained R. Brown's name, *C. fenestrata*, in preference to the older Linnean *C. grœnlandica*, because R. Brown's description enabled us first unmistakably to recognize the species.

Silenaceæ, *Braun*.

25. *Silene acaulis*, L.—On sand- and gravel-terraces at the base of the mountains, on the northern and western coasts, not very scarce. At Magdalena Bay it has been found 2000 ft. above the sea. In flower at Treurenburg Bay and Wide Bay early in July, and with ripe seed-vessels at Smerenburg Bay 1st September.

26. *Wahlbergella apetala*, L., Fr. *Lychnis apetala*, L., Wbg., R. Br., Hooker; *Melandrium apetalum*, Fenzl., Ledeb., Hrtm.—North-west coast; also at Hinlopen Strait, but scarce. Past flower on Norse Island and Cross Bay at the end of July; and seed almost ripe at Lomme Bay August 24th, and at Ice Sound in September. This plant is more downy than the Scandinavian one, but is otherwise like it.

27. *W. affinis*, Fr. Herb. Norm. fasc. 2, n. 36.—At Wide Bay in the north. Early in July in flower. This differs from the preceding in

its more tender habit, erect flower, compressed, narrow, not inflated calyx, and longer petals. The Spitzbergen plant is an annual. It differs from *Lychnis triflora*, Fl. Dan. fig. 2173, which Hartman quotes as a synonym.

Alsinaceæ, *Bartl.*

28. *Stellaria Edwardsii*, R. Br.; *S. longipes*, Goldie, var. *humilis*, Ledeb.; *S. nitida*, Hooker, in Scoresby, in Linn. Trans.; *S. læta*, Richards., in Frankl. Narrative, p. 738; *S. longipes*, Goldie, Hooker, according to specimens from Becchey Island, in Arctic America, communicated by J. D. Hooker to the Riks Museum.—The smooth form only is found in Spitzbergen. It is very general on mountain-sides and on islets up to Brandywine Bay and Low Island. In flower at Brandywine Bay, 27th July. It is very variable in appearance and in the form of the leaves.

29. *S. humifusa*, Rottb., Hartman, Hooker; *S. crassifolium*, β, Wbg.—North and west, rare; Hecla Cove (Parry), Grahuk, Ice Sound, and Bellsund. In flower at Grahuk in the end of July.

30. *Cerastium alpinum*, L.—Very general, whenever the ground, in summer, is free from snow. In flower at Brandywine Bay, high above the sea, 27th July; at Augusti Bay, near the snow-line, and at Magdalena Bay, more than 2000 feet above the sea. At Treurenburg Bay it was in flower 26th June, and in the beginning of July its flowers were to be seen everywhere.

This plant varies exceedingly. The most distinct forms are:—

α. foliis oblongis vel elliptico-lanceolatis, caule 6–8-pollicari.

β. *latifolium*, Hrtm. Herb. N. Fasc. ix. n. 29.

γ. *cæspitosum*, nob., which I should consider a good species, but for the transition forms. *C. vulgatum*, Smflt., belongs to this variety. It may be thus characterized:—*C. cæspitosum?*; caulibus 1–3-floris, inferne glaberrimis, superne pubescentibus; foliis infimis persistentibus, ovato-ovalibus, obtusis, sæpe quadrifariam imbricatis (ut in *Saxifr. oppositifolia*), glaberrimis vel basi ciliatis, foliis summis late ovatis, glabris, ciliatis, bracteis ovatis carinatis, versus apicem margine membranaceis, dense ciliatis, carinaque parce hirsutis; sepalis ovatis, obtusis, apice late membranaceis, petalis calyce 2–3-plo longioribus, apice bifidis; capsula?

C. cæspitosum forms close perennial tufts, 2–3 in. broad and 1–½ in.

high, with smooth stems and branchlets. The flower-stalks are seldom higher than 2 inches, and the leaves, compared with the other varieties, are very small. On the north coast this is the most abundant variety.

31. *Arenaria ciliata*, L., Ledeb.—Very rare; hitherto found only on the west coast, at King's Bay and Ice Sound.—This differs from the plant of Russian Lappmark in having larger flowers.

32. *A. Rossii*, R. Br. in Parry.—Very rare; coming into flower at Augusti Bay, 4th August, and at Lomme Bay.

33. *Ammadenia peploides*, (L.), Gm.; *Arenaria peploides*, L., Wbg., Hook., DC.; *Honckeneya peploides* (Ehrh.), Ledeb.; *Halianthus peploides*, Fr., Hartm.—On the south-west, at Ice Sound, Nordenskiöld, 1858. The specimens are prostrate, from 3–4 inches high, and in the form of the leaves are near Hartman's var. *oblongifolia*.

34. *Alsine biflora*, L.; *Arenaria Scandinavica*, Sprg.—On the west coast, up to Magdalena Bay, not rare. In flower at Cross Bay, 31st July; Magdalena Bay, King's Bay, and Ice Sound, Nordenskiöld.

35. *A. rubella*, Wbg.; *Arenaria quadrivalvis*, R. Br.; *A. verna*, var. *θ. glacialis*, Ledeb. Fl. Ross. i. 350; *A. arctica*, Smflt. !—As far as Brandywine Bay, very general, both on the north and west, and at Hinlopen Straits. In flower on the north-east, lat. 80°, 7th July, and at Wide Bay early in July, and afterwards in flower and fruit at Lomme Bay, Augusti Bay, Cross Bay, Ice Sound, and on the southern part of Hinlopen Straits.

36. *Sagina nivalis*, (Lindbl.), Fr. Herb. Norm. Fasc. xii. n. 51; *S. intermedia*, Fenzl, in Rupr. Flor. Samojed. p. 25; *Arenaria cæspitosa*, J. Vahl, Flor. Dan. fig. 2289; *Spergula saginoides*, Vahl, Ch. Martins, and Hooker.—Very sparingly on the west and north; on the north-east, lat. 80°, at Treurenberg Bay, Wide Bay, Ice Sound, and Bellsund, Nordenskiöld.

Spergula saginoides, Sw., which is quoted by Hooker, Vahl, and Ch. Martins, for Spitzbergen, no doubt belongs to this species.

Dryadeæ, *Bartl.*

37. *Dryas octopetala*, L.—Very common up to Brandywine Bay. Reaches the snow-line. In flower on the north-east, lat. 80°, 7th July. Extremely variable in the form of the leaves. In Regel and Tiling's "Florula Ajanensis," published in the Nouv. Mém. de la Soc. Imp. des Naturalistes de Moscou, vol. xi. p. 81, a variety *longifolia* of

D. octopetala, common in Greenland and Arctic America, is described, which is intermediate between that species and *D. integrifolia*, Vahl; these authors consider this latter species as only a variety of *D. octopetala*. In the north of Spitzbergen this var. *longifolia* occurs very generally, and often in the same tuft with the normal form; but I never found it with such entire leaves as the Greenland *D. integrifolia*, although they were often quite as narrow. I agree, nevertheless, in the opinion of Messrs. Regel and Tiling, that *D. integrifolia* is only a variety of *D. octopetala*, L., peculiar to Greenland and the Archipelago of America.

38. *Potentilla pulchella*, R. Br.; Lehm. Revis. Potent. p. 36; *P. Keilhaui*, Smflt.—West and north, rather rare. Treurenburg Bay, in flower 7th July; Lomme Bay, past flowering 23rd August; Ice Sound and Bellsund, Nordenskiöld.

39. *P. maculata*, (Pourret), Lehm. Revis. Potent. p. 119; *P. Salisburgensis*, Hænke, Ledeb., Trauv.; *P. alpestris*, Hall, Fil. sec. Lehm. —1 foot high at King's Bay, in August.

40. *P. nivea*, L., Lehm. Revis. Potent. p. 165, Hrtm.—Very rare on the west and north; Treurenburg Bay, Hecla Cove, W. J. Hooker, in Parry; south-western coast, Ice Sound, Nordenskiöld, 1858. Nordenskiöld's specimens are 5–7 inches high, and the leaves silver-white below.

41. *P. emarginata*, Pursh; Lehm. Rev. Potent. p. 161.—Pretty general up to Seven Island, Nordenskiöld. Extends to the snow-line, and was gathered at Magdalena Bay, 2000 feet above the sea. In flower on the north-east, lat. 80°, July 7th; at Wide Bay, July 12th; at Brandywine Bay, July 27th; past flower in August and September, Lomme Bay, Magdalena Bay, and Ice Sound.*

Saxifrageæ, *Juss.*

42. *Saxifraga hieracifolia*, Waldst. et Kit. Fl. D. 2351.—Rather rare, and as yet only found on the west at Magdalena Bay, 300 feet above the sea; at King's Bay, in August, the plants were 12 inches in height; Ice Sound and Bellsund, Nordenskiöld. It grows among the loose stones on the mountain-sides.

43. *S. nivalis*, L., Wbg., De Cand.—Very general on the west, north, and east (Hinlopen Straits), on the mountain-sides; Augusti Bay, 600

* *Sedum Rhodiola*, De Cand., is recorded for Spitzbergen by Dr. J. D. Hooker, Linn. Trans. xxiii. p. 291.

feet above the sea; on the north-east, lat. 80°, and at Treurenburg Bay, in flower 6th July; at Brandywine Bay, 27th July; and still in flower, 1st September, in Smerenburg. Specimens from Advent Bay are 10 inches high.—*S. nivalis*, v. *tenuis*, Wbg., Augusti Bay, 600 feet above sea, and Wide Bay.

44. *S. foliolosa*, R. Br., Hook.; *S. stellaris*, v. *comosa*, De Cand.; Ledeb. Fl. D. 2354; Hrtm.—On the west coast rather rare, on the north very rare; Treurenburg Bay, Hecla Cove, Parry; Smerenburg, 1st September, without a flower; King's Bay, Cross Bay, Ice Sound, and Bellsund. It is not found high above the sea-level, but prefers mossy terraces sheltered by the mountains.

The true *S. stellaris*, L., is not found in Spitzbergen.

45. *S. oppositifolia*, L.—Abundant, in small tufts, on sand and gravel; Walden Island, Parry; Seven Island, Nordenskiöld; it is also found on the mountains in the north as high as 1000 feet above the sea, at which height eternal ice and snow generally begins.

I first gathered it in flower at Treurenburg Bay on the 25th of June, and I observed it still in flower in September. Before leaving Finmarken, I found this Saxifrage in flower on the 9th of May, at Carlsö, lat. 70° N.

46. *S. flagellaris*, (Sternb.), R. Br.; Fl. D. 2353; Fl. B. Am. i. tab. 87, fig. B.—Sparingly up to Brandywine Bay, on clayey sand and gravel, mostly at the base of the mountains, but also some 700–800 feet above the sea, near the snow-line, at Augusti Bay. The first flowers were seen, 7th July, at Treurenburg Bay and on the north-east, lat. 80°. Like the other Saxifrages, this species was in flower to the end of August.

47. *S. Hirculus*, L.—Rather scarce on the west and at Hinlopen Strait (Lomme Bay and Augusti Bay), but not yet found on the north. Found chiefly on the lowest terraces near the sea, which are washed by snow-water from the mountains. Hinlopen Strait, in flower all August, and at Ice Sound in September.

48. *S. aizoides*, L.—Rare, but growing further north and higher on the mountain-sides than *S. Hirculus*. Treurenburg Bay, Hecla Cove, Parry. Grows, like the last species, in tufts on mossy spots on the mountain-sides, which are always kept damp by the snow-water. Cross Bay, in flower 31st July; Lomme Bay 24th August, 2-300 ft. above the sea.

49. *S. cernua*, L.—Very common wherever the ground is free from

snow in summer. It grows in every kind of soil, but thrives best under the bird-cliffs, where it forms small tufts 2–4 inches in diameter, and reaches a height of 10 inches; the common height is 5–6 inches. In flower at Treurenburg Bay 6th July, and there seen flowering all summer. Walden Island, Parry; Seven Island, lat. 80° N., 1000 ft. above the sea, Nordenskiöld.

50. *S. rivularis*, L.—Pretty general up to Brandywine Bay and Seven Island (Nordenskiöld), and on the mountain-sides to the snow-line. In flower July 1st, at Treurenburg Bay, and afterwards during the whole summer. Growing in wet moss, it is precisely like the European plant; but on gravelly and wet soil, it forms low (1 inch high) and close tufts, unlike the ordinary form in outward appearance, but not differing essentially from it. A remarkable form is the var. *hyperborea*, R. Br. in Parry, which is not very rare on the north coast and at Hinlopen Strait.

51. *S. cæspitosa*, L.; *S. grœnlandica*, *S. uniflora*, R. Br.—General on the coasts and islands up to Brandywine Bay; Walden Island, Parry, and Seven Island, Nordenskiöld. The ordinary form in the north is *S. uniflora*, R. Br., which forms close tufts 3–4 inches in diameter, and is found extending from the shore to the snow-line. At Magdalena Bay the typical plant was gathered 2000 ft. above the sea. At Treurenburg Bay it flowered July 2nd, and continued in flower till September.

52. *Chrysosplenium alternifolium*, L., var. *tetrandrum*, Lund.; Th. Fries, Bot. Notiser, 1858, p. 193.—Only met with yet, and but rarely, on the west coast at Bellsund, Ice Sound, and King's Bay. The fruit was nearly ripe, 15th August, at King's Bay.

Synantheræ, *Rich.*

53. *Arnica alpina*, Murr. Ledeb.; *A. angustifolia*, Fl. D. 1524; *A. montana*, β. Linn. Wbg. Fl. L. p. 210.—With a single flower, sometimes with two or three; more than a foot high, the Spitzbergen plants are more beautiful and luxuriant than any we have seen on the mountains of Scandinavia. In full flower at Ice Sound, Green Harbour, some hundred feet above the sea, as well as on the plains southward of the entrance to Ice Sound in the beginning of September.

54. *Erigeron uniflorus*, L.; *E. eriocephalus*, J. Vahl; Fl. D. 2299;

E. pulchellus, β. *Unalaschkensis*, DC., *fide* Ledeb. Fl. R.; Vahl.—This differs from the Scandinavian plant in the more pointed involucre scales, and in its greater hairiness; but as these are variable characters in the Scandinavian as well as in the North American specimens which I have seen, I have referred this plant to the same species, especially as it agrees with the *E. uniflorus* of Herb. Norm. 8. n. 3.

Found only as yet on the west as far as Magdalena Bay, reaching to 800–1000 feet above the sea. In flower at Cross Bay, August 10, and at Ice Sound in September. Attains a height of five inches, and has both white and red flowers.

55. *Nardosmia frigida*, (L.), Hooker, Ledeb., De Cand.—*Tussilago frigida*, L.; *Petasites frigida*, Fr., Hrtm.—Rare on the west. Leaves (1–1½ inches in diameter) only were gathered at King's Bay in August. Leaves were also brought from Ice Sound by Nordenskiöld in 1858.

56. *Taraxacum palustre*, (Lm.), Fl. D. 1708; *T. Scorzonera*, Reichenb., sec. Trautveller, in Middend. Sibir. Reise, i. 2, p. 40.—Like the figure quoted, except that the leaves are not so deeply lobed. Fries's *T. palustre*, Herb. Norm. fasc. 13, n. 29, has the leaves more entire, and only half the size of our Spitzbergen plant. King's Bay, past flowering 13th August; Cross Bay.

57. *T. phymatocarpum*, Vahl, Fl. D. 2298.—Grows sporadically along the whole western and northern coasts. Wide Bay, in flower 10th July; in fruit 23rd August at Lomme Bay; Cross Bay and Ice Sound, and at Hecla Cove, Parry.

Boragineæ, *Juss.*

58. *Mertensia maritima*, (L.), De Caud., Ledeb.; *Pulmonaria maritima*, L.—Small specimens, 2–3inches high, from the shore at Ice Sound, O. Torell, 1588.

Polemoniaceæ, *Juss.*

59. *Polemonium pulchellum*, (Bunge), Ledeb. Fl. Ross.; *P. humile*, W. Cham., Linnæa, vi. p. 552; *P. cæruleum*, v. *humile*, Hook. Fl. B. Amer. ii. p. 71; *P. cæruleum*, v. *nanum*, Hook. Linn. Trans. xiv. p. 377.—At Ice Sound, Green Harbour, in September almost out of flower; 4–5 inches high.

Personatæ, *Linn.*

60. *Pedicularis hirsuta*, L., Wbg., Hook., Ledeb.—Scattered along the west, north, and east (Hinlopen Strait) coasts. Wide Bay, in

flower 14th July; Magdalena Bay (8–9 inches long), Augusti Bay, and Ice Sound, in fruit in the end of August and the beginning of September.

Ericineæ, *Juss.*

61. *Andromeda tetragona*, L., Wbg., Hook., Fr.; *Cassiope tetragona*, Don, De Cand., Ledeb.—On sand and gravel along the west, north, and east coasts, but scarce. At Lomme Bay, 300 feet above the sea; Treurenburg Bay, in flower 4th July, and Wide Bay 12th July.

Empetreæ, *Nutt.*

62. *Empetrum nigrum*, L., Bellsund, Vahl, and Ch. Martins.

Polygoneæ, *Juss.*

63. *Polygonum viviparum*, L.—Very general, on spots of rich soil, as far as Brandywine Bay. Rises 600 feet above the sea, under lat. 80°. The typical plant is most common on the west, but on the north the var. *alpinum*, Wbg. Wide Bay, in flower 14th July; Augusti Bay, 4th August; but past flowering in the end of July, on Norse Island, and in the beginning of August at Magdalena and Cross Bays.

[63*. *Kœnigia Islandica*, L.—On the west coast, O. Torell, 1858.]

64. *Oxyria digyna*, (L.), Campd.; *Rumex digynus*, L.; *Rheum digynum*, Wbg.; *Oxyria reniformis*, Hook.—In similar localities with *P. viviparum*, but more general and with a wider range, being found wherever the moss has formed a suitable soil. Seven Island, and on the mountain-sides to the snow-line, Nordenskiöld. Generally 3–5 inches high, with root-leaves $\frac{1}{2}$ inch in diameter; but on richer spots, under lat. 80°, it attains a height of 8 inches, with root-leaves 1–1$\frac{1}{2}$ inches broad. Treurenburg Bay, in flower 28th June; in the beginning of July it was generally in bloom.

Salicineæ.

65. *Salix reticulata*, L.—Bellsund, Vahl; his specimens are in the Riks Museum. The leaves are very small, being about $\frac{1}{4}$ inch broad.

66. *S. polaris*, Wbg. Fl. Lap. 261, tab. xiii. fig. 1; *S. herbacea*, Sol., Hooker, in Parry.—This Willow is found wherever moss or soil covers the rock. The stem is generally not more than 1 line in diameter, though rarely, under very favourable conditions, it may be found as

thick as one's little finger, with large leaves ($\frac{3}{4}$ of an inch broad) and branches as thick as the ordinary stems.

One of the most common plants found in the extreme north-west islands, and on the highest mountains, as far as vegetation is possible. Blooming branchlets were seen at Treurenburg Bay, in the end of June and throughout the summer.

(The remainder in our next number.)

THE GENUS ASCOBOLUS,

WITH DESCRIPTIONS OF THE BRITISH SPECIES.

By M. C. Cooke.

This genus has of late received so many additions, that it becomes numerically important, and through the successful investigations of Messrs. Broome and Currey, of considerable interest to the British mycologist. In Fries's Syst. Myc. only 11 species are enumerated, whilst the present number is not less than 34. For the species added since the publication of Fries's work, we are indebted to the Rev. M. J. Berkeley for 1, to Beccari for 1, to Preuss for 2, to Mr. Currey for 3, and to the brothers Crouan for 14.

According to our present knowledge, the genus would appear to be essentially European, one species only (*A. furfuraceus*, P.) having been recorded as occurring beyond this limit, viz. in Chili, and that one of the most common of European forms. In Europe the species seem to be confined to the countries of the west; all those discovered by the Messrs. Crouan having been found near Brest, and 4 others of the new species in Great Britain. Of the 34 species, 16 are British, and 3 of these are at present peculiar to the United Kingdom, whilst 13 are found also on the Continent. These remarks may not however long remain true, for it is exceedingly probable that a wider range will be ascertained for the distribution of the genus when the minute fungi of Eastern Europe, as well as of the rest of the world become better known. Recently Mr. Currey detected his *A. saccharinus* on old leather from the Simplon, and the other species, first found by him, will also probably soon be found elsewhere in Europe.

A large number of the species enumerated have their natural habitat

on the excrement of various animals, a few only are found on plants, and two on old rags or leather.

External features have been taken advantage of to arrange the members of the genus in the following synopsis, in preference to a sole regard to the microscopical structure or disposition of the fruit. However important such features may be in the determination of species, they could scarcely have been made satisfactorily available in the subdivision of the genus. The occurrence of sixteen sporidia in each ascus in *Ascobolus sexdecimsporus*, and of thirty-two in *A. Pelletieri*, is not without importance. The expulsion of the spores in *A. Kerverni* in a mass enclosed in a special inner membrane does not appear to be confined to that species, but will probably be found to be very general throughout the genus.

In rendering this synopsis as complete as it is, I am indebted to the courteous assistance of Messrs. Currey and Broome, for details and drawings of the fructification of several species.

Ascobolus, *Pers.*

Receptacle orbicular, marginate. Disk patellæform. Asci exploded (*Berk. Outl. p.* 374).

I. Echinatæ.—*Externally spiny, hairy or papillose.*

1. A. porphyrosporus, *Fr.*
2. A. pulcherrimus, *Crouan.*
3. A. papillatus, *Wallr.*

II. Furfurosæ.—*Externally furfuraceous or mealy.*

* *Stipitate.*

4. A. lignatilis, *A. and S.*

** *Sessile.*

5. A. furfuraceus, *Pers.*
6. A. viridis, *Curr.*

*** *Immersed.*

7. A. immersus, *Pers.*
8. A. sphæricus, *Preuss.*

III. Lævigatæ.—*Externally smooth, with or without a ciliated margin.*

* *Substipitate.*

9. A. denudatus, *Fr.*

** *Sessile.*

† *Margin ciliate or lobed.*

10. A. ciliatus, *Schm.*
11. A. insignis, *Crouan.*
12. A. vinosus, *Berk.*
13. A. Crouani, *Cooke* (*A. miniatus*, Cr., non Preuss.)

†† *Margin entire.*

Growing on dung.

14. A. glaber, *Pers.*
15. A. carneus, *Pers.*
16. A. cinereus, *Crouan.*
17. A. ærugineus, *Fr.*

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18. A. granuliformis, *Crouan.*
19. A. microscopicus, *Crouan.*
20. A. argenteus, *Curr.*
21. A. albidus, *Crouan.*
22. A. pilosus, *Fr.*
23. A. macrosporus, *Crouan.*

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24. A. Kerverni, *Crouan.*
25. A. sexdecimsporus, *Crouan.*
26. A. Pelletieri, *Crouan.*

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27. A. testaceus, *Wallr.*
28. A. saccharinus, *B. and Curr.*
29. A. Crec'hqueraultii, *Crouan.*
30. A. immarginatus, *Beccari.*
31. A. miniatus, *Preuss.*
32. A. coccineus, *Crouan.*
33. A. Brassicæ, *Crouan.*
34. A. Trifolii, *Bernh.*

Descriptions of the species found in this country are appended. Several of the new species found by the brothers Crouan around Brest were detected in this country last autumn by Mr. C. E. Broome, specimens of which have been added by him to the herbarium of the British Museum. It is not improbable that others may yet be met with in parts of the country beyond the range of Mr. Broome's excursions.

Two of the species found by Mr. Currey are now described by him for the first time.

BRITISH SPECIES.

5. ASCOBOLUS FURFURACEUS, *Pers.*; sessile, slightly concave, brown or greenish, externally furfuraceous; asci clavate, with an inner separable membrane; sporidia almond-shaped, biseriate rugose, amethyst-purple.

Pers. Obs. i. t. 4. f. 3–6; Fr. Sys. Myc. ii. p. 163; Grev. Fl. Ed. p. 426; Sc. Crypt. Fl. t. 307; Berk. Eng. Fl. v. p. 209; Outl. p. 374; Currey, Linn. Trans. xxiv. t. xxv. f. 9, 10; Cooke, Ind. Fung. n. 1888. *Peziza stercoraria*, Bull. t. 376, 538. f. 4; Sow. t. 18, 389. f. 3–6; With. iv. p. 309. *P. fusca*, Bolt. t. 109, f. 2; With. x. p. 309. *P. violacea*, Relh. 558. *P. atra*, Huds. Fl. Ang. 637; With. iv. p. 313.

Fig. 1.

On cow-dung, all the year. Very common.

Fig. 1. Ascus and sporidia: *magnified.*

6. ASCOBOLUS VIRIDIS, *Curr.*; sessile, plane or very slightly concave, of a dark, dingy, yellowish-green colour, externally very furfuraceous, almost tomentose; sporidia elliptic-acuminate, rugoso-striate, amethyst purple.

Curr. in Linn. Trans. xxiv. p. 154, 1863; Cooke, Ind. Fung. Brit. n. 1889.

On clay ground, Hanham woods, near Bristol. October 15, 1861. (*F. Currey.*) Leigh wood, Bristol, September, 1848. (*C. E. Broome.*)

9. ASCOBOLUS DENUDATUS, *Fr.*; gregarious, yellowish-green, smooth, turbinate, substipitate; disk plane. [Asci clavate; paraphyses simple; sporidia eight, violet-coloured when mature, irregularly rugose, ovate or elliptic, 0·0007–0·0008 in. long.]

Fries, Sys. Myc., ii. p. 164.

On old fir-poles (*Fries*). On the ground attached to little roots, etc. Marlborough Forest. October 15, 1863 (*C. E. Broome*).

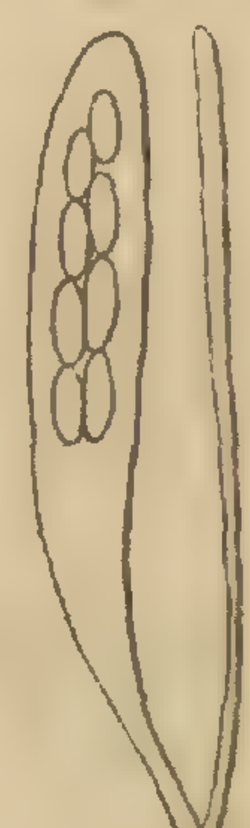


Fig. 2.

Fig. 2. Ascus, sporidia, and paraphysis: *magnified.*

10. ASCOBOLUS CILIATUS, *Schm.*; sessile, subhemispherical, smooth, orange; disk plane; margin swollen, white, fringed with white hairs; asci large; sporidia broadly elliptic.

Schmidt, Myc. Hefte, i. p. 90; Pers. Myc. Eur. i. p. 340; Fr. Sys. Myc. ii. p. 164; Berk. Eng. Fl. v. p. 209; Outl. p. 374; Cooke, Index, Fung. Brit. n. 1891.

On cow-dung. Autumn.

12. Ascobolus vinosus, *B.*; sessile, at first globose, then depressed, smooth, dull purple, orifice laciniate; asci nearly linear, thickest at their tips. Sporidia elliptical, rugose, at first colourless then purple, eventually brown, 0·0008 to 0·0009 inch long.

Berk. Eng. Flora, v. p. 209; Outl. p. 374; Cooke, Ind. Fung. Brit. n. 1890.

On rabbit-dung.

12. Ascobolus Crouani; colour of minium, sessile, fleshy, smooth, first urceolate, then hemispherical; hymenium flat, surrounded by a more or less incised, soft, white, membranaceous frill; asci wide, straight or incurved, enclosing eight round sporidia, each one having a large nucleus in the centre, surrounded by a circle of smaller ones; paraphyses filamentous, simple or forked, thickened at the apex, and much longer than the asci; receptacle composed of round or oval cellules, very small, closely packed, intermixed with articulated, hyaline, anastomosing, or confluent filaments.

Ascobolus miniatus, Crouan (non Preuss), Ann. des Sc. Nat. 1858, vol. x. p. 197. t. 13. f. I 44–47.

On the earth, amongst small mosses. Autumn. (*C. E. Broome.*)

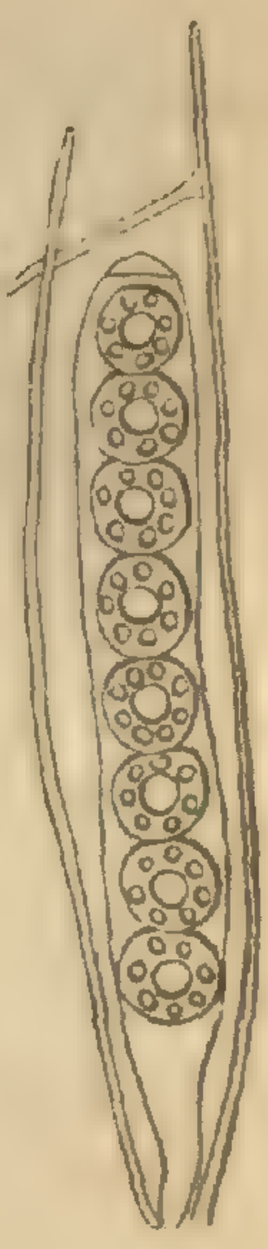


Fig. 3. Ascus, sporidia, and paraphyses: *magnified* 120.

Fig. 3.

I have altered the specific name *miniatus*, as it was previously employed by Preuss for a different species (Linnæa, 1851, p. 147). Nearly half the number of species described and recorded at the present time are due to the investigations of the Messrs. Crouan, of Brest.

14. Ascobolus glaber, *Pers.*; sessile, minute, smooth, shining, somewhat convex, marginate, colour variable from white or orange to vinous-brown; asci nearly equal; sporidia at first hyaline, then amber-coloured, at length deep violet, reticulated, 0·0009–0·001 in. long.

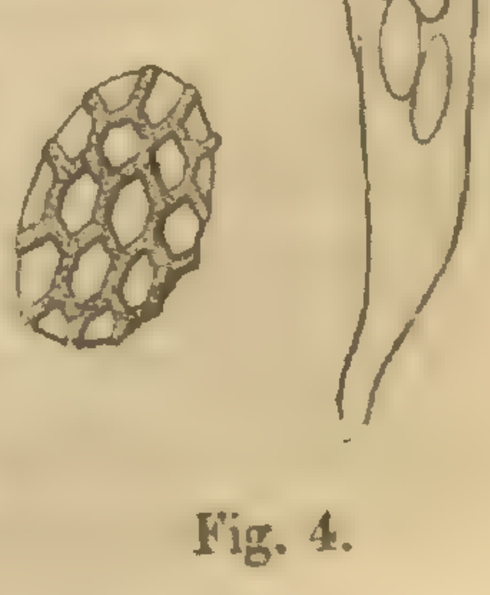


Fig. 4.

Pers. Obs. i. t. 4. f. 7; Syn. p. 667; Fr. Sys. Myc. ii. p. 164; Berk. Eng. Fl. v. p. 209; Outl. p. 374; Cooke, Ind. Fung. Brit. n. 1892.

On cow-dung. Autumn. (*Berk.*) On rabbits' dung. Autumn, 1863. Bathford and Ascot. (*C. E. Broome.*)

Fig. 4. Ascus and sporidia, *magnified*, with sporidium still further magnified.

15. ASCOBOLUS CARNEUS, *Pers.;* gregarious, minute, sessile, plane, immarginate, smooth, flesh-coloured.

Pers. Syn. p. 676; Fr. Sys. Myc. ii. p. 165; Berk. Outl. Fung. p. 374; Cooke, Ind. Fung. Brit. n. 1894.

On cow-dung. Autumn.

17. ASCOBOLUS ÆRUGINEUS, *Fr.;* gregarious, sessile, nearly plane, marginate, smooth, greenish.

Fries, Obs. ii. p. 310; Sys. Myc. ii. p. 164. *A. marginatus*, Schum. Saell. ii. p. 437.

On horse-dung. August. Mr. Broome finds an *Ascobolus* near Bath, which he considers to be this species.

18. ASCOBOLUS GRANULIFORMIS, *Crouan;* sessile, spherical, pale yellow-ochre, translucent, opaque in the centre, smooth; asci very small, wide, enclosing eight, hyaline, oval sporidia; paraphyses colourless, thickened into a club-shape at their apex; receptacle formed by an anastomosing, reticulated, filamentous tissue of an extreme thinness.

Fig. 5.

Crouan, in Ann. des Sc. Nat. 1858, vol. x. p. 196. t. 13. f. 27–31.

Common on cow-dung, in October and November, 1863. (*C. E. Broome.*)

Fig. 5. Ascus, sporidia, and paraphysis: *magnified* 120.

20. ASCOBOLUS ARGENTEUS, *Curr.;* gregarious, exceedingly minute, barely visible to the naked eye, subpyriform, of a silvery-white colour; sporidia elliptical, colourless, 0·0005 inch long.

Fig. 6.

F. Currey, in litt.

On cow-dung, Eltham. November, 1863. (*C. E. Broome.*)

Fig. 6. Asci and sporidia: *magnified* 430.

23. ASCOBOLUS MACROSPORUS, *Crouan;* very small, of a clear greenish-yellow, smooth, subcylindric or hemispherical; hymenium flat; asci large and wide, enclosing eight, very large, ovoid sporidia, surrounded by a wide hyaline membrane, purple-violet; paraphyses colourless, filiform; receptacle small, the cellules which compose it anastomose and form a reticulated tissue.

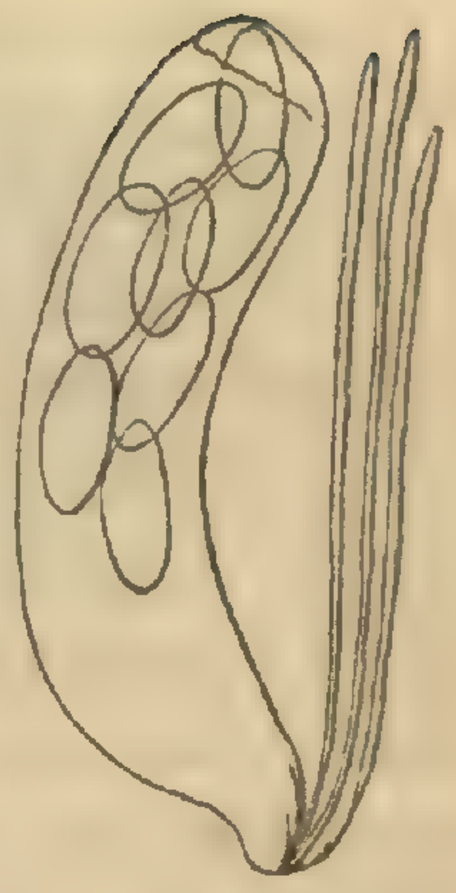


Fig. 7.

Crouan, in Ann. des Sc. Nat. 1857, vol. vii. p. 74, t. 4, 5–8.

On old cow-dung in the environs of Brest. (*Crouan.*) On sheep and horse dung. Autumn, 1863. Batheaston. (*C. E. Broome.*)

Fig. 7. Ascus, sporidia, and paraphyses: *magnified* 120.

24. ASCOBOLUS KERVERNI, *Crouan;* very small ($\frac{1}{24}$—$\frac{1}{12}$ inch diameter), fine golden-yellow, sessile, hemispherical, sometimes subcylindrical; hymenium flat or convex; asci wide, incurved, enclosing eight elliptical spores, first white, then rosy, and finally of a beautiful violet, disposed at the summit of the ascus, in an oblong mass, enclosed in a hyaline membrane; paraphyses simple, filiform, a little thickened at their summit, and of a yellow colour; receptacle composed of a thin filamentous tissue, anastomosing in a reticulated manner.

Fig. 8.

Crouan, in Ann. des Sc. Nat. 1858, vol. x. p. 193. t. 13. f. B 7–11.

In small groups upon old cow-dung. Bathford. October, 1863. (*C. E. Broome.*)

Fig. 8. Ascus, sporidia, and paraphyses: *magnified* 120.

25. ASCOBOLUS SEXDECIMSPORUS, *Crouan;* white, then whitish-grey, at length of a clear yellowish-white, minute, sessile, hemispherical; hymenium flat or slightly convex; asci small, wide, enclosing sixteen, ovoid, hyaline spores; paraphyses numerous, colourless, simple or branched below, straight or curved at the apex, where they are a little thickened; receptacle non-gelatinous, composed of very small hexagonal cellules.

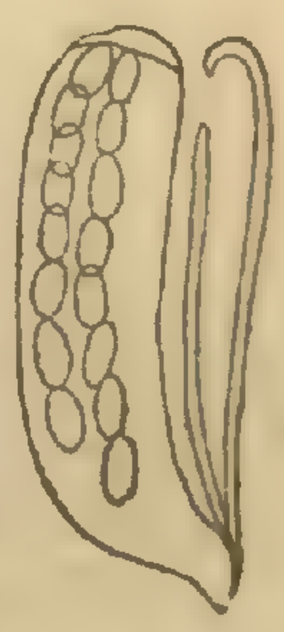


Fig. 9.

Crouan, in Ann. des Sc. Nat. 1858, vol. x. p. 195. t. 13. f. E 21–26.

In marshes, on the droppings of cows and horses. Hanham, near Bristol. October, 1863. (*C. E. Broome.*)

Fig. 9. Ascus, sporidia, and paraphyses: *magnified* 120.

28. Ascobolus saccharinus, *B. and Curr.;* scattered or crowded; disk almost hemispherical when young, afterwards expanded and plane, of a reddish-pink, or salmon colour, when dry paler towards the margin; plant attached at the base by white downy threads; hymenium somewhat glistening, looking as if sprinkled with minute particles of brown sugar; sporidia elliptical, colourless, 0·0007 to 0·0008 inch, long.

F. Currey, in litt.; Berk. Outl. p. 374; Cooke, Ind. Fung. n. 1895.

On old leather, and also on old rag. Chiselhurst Kent. (*F. Currey.*)

Fig. 10. Ascus and sporidia: *magnified* 430.

34. Ascobolus trifolii, *Bernh.;* sessile, epiphyllous, minute, rather plane, smooth, pale yellow. Sporidia elliptical, rather minute, sometimes with a nucleus at each end.

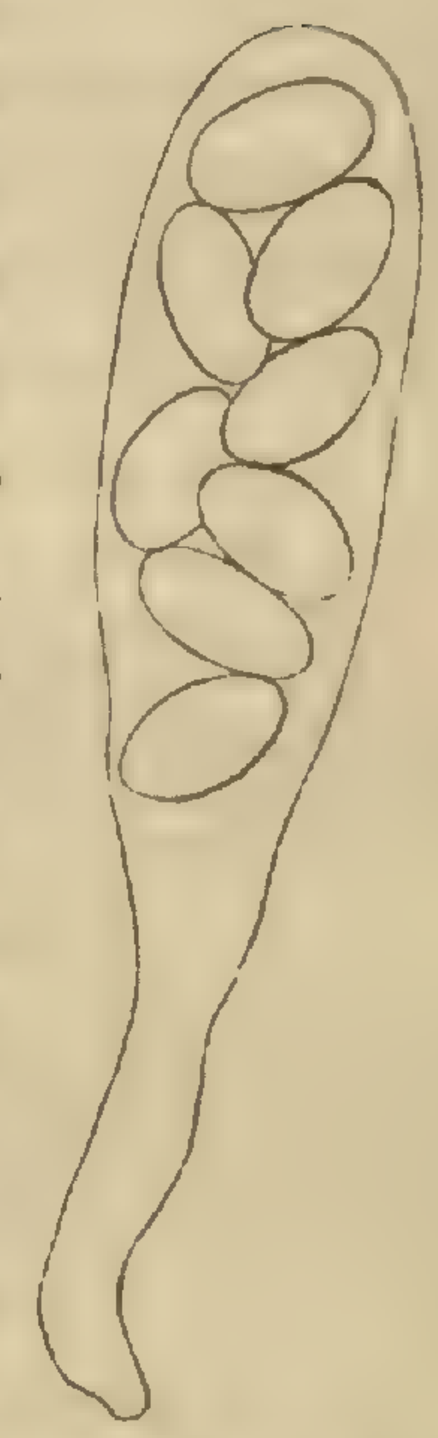


Fig. 10.

Biv. Bernh. St. Rar. t. 6. f. 3; Fr. Sys. Myc. ii. p. 165; Desmz. n. 520; Berk. Eng. Fl. v. p. 209; Outl. p. 374; Cooke, Ind. Fung. Brit. n. 1893.

On living clover-leaves.

CORRESPONDENCE.

Calluna vulgaris *in Newfoundland.*

Glasnevin, 12th April, 1864.

When I read the note from 'Silliman's Journal' by Asa Gray, quoted in the 'Journal of Botany' for January, 1863, relative to the common Ling, *Calluna vulgaris*, having been lately discovered in the State of Massachusetts, with the further notice that De la Pylaie had at an earlier date mentioned it as a native of Newfoundland, I intended to send you a note confirming the correctness of the latter part of the sentence, but, like more good intentions, it was not carried out at the proper time, and consequently lost sight of. I have,

however, been again reminded of the circumstance, by seeing in the last number of the 'Natural History Review' a short article on the same subject, by H. C. Watson. I shall therefore, without more delay, endeavour to record my story, which establishes the fact that our common Ling Heath is found in Newfoundland.

In the year 1852 Mr. Ensor, of Dublin, brought to me from Newfoundland a number of plants of *Sarracenia purpurea*, and along with them two tufts of the common Ling Heath, which he told me grew in considerable quantities on a boggy part of his property, near to the place where he had dug out the plants of *Sarracenia*. I had the Newfoundland Heaths planted, one of which luckily grew, and is still living in this garden. It is what we would call a slender-growing variety if found in Britain, and what is more remarkable, either from being long accustomed to be covered with snow in winter, or from being naturally more tender, it is constantly nipped on the points of its shoots by frosts; besides, the foliage gets browned from some cause, whilst Irish plants growing near it remain unscathed.

D. Moore.

The Horticultural Society's Prizes for County Herbaria.

The Council of the Horticultural Society offers prize medals for the best county-collections of dried British plants, as reported in the 'Journal of Botany,' No. XV. p. 96. These prizes are stated to be "for the encouragement of the study of scientific botany amongst all classes." This avowed purpose can hardly be held otherwise than a commendable and desirable end to be attained, whatever may be thought of the means by which it is sought to be effected.

Professor Babington decidedly objects to the prizes, on grounds sufficiently explained by himself on page 121 of the succeeding number of the Journal; namely, on account of the tendency which prizes so offered must have towards causing the extirpation of our rarest plants. No doubt the great majority of scientific botanists will concur with Professor Babington in deprecating any such encouragement to extirpation, if this must be expected as a probable consequence. The Professor appears to assume that "best" collections will be understand to mean those which contain examples of the rarest or most local species; and that is undoubtedly the usual reading of the adjective when applied to herbariums.

But is there no modification or middle course which may still educe the good results expected from the offer of these prizes, and yet avoid the ill consequences apprehended? It seems easy enough to hit upon a plan which will suit the dilemma, by keeping the good and eliminating the ill tendencies. Suppose that the prizes are offered for a fixed number (say 300 or 400) of the commoner species of the county; the tests of goodness being the completeness and condition of the specimens, the correctness of their nomenclature, etc.; but rare or very local species not being counted at all, or (better) expressly forbidden. Common plants are just as suitable for botanical study as rarities, even more suitable for young botanists. And as common plants are attainable

with small sacrifice of time and money, a larger number of competitors would be encouraged among the employed classes, few of whom could spare the time and outlay that would be needlessly expended in making complete collections of rarities for tracts so large as a whole county.

Notwithstanding the mention of "all classes," it is presumed that the prizes must be chiefly intended to stimulate young gardeners, and perhaps others of similar social position, to acquire some knowledge of technical botany. It is not likely that more advanced or professed botanists would care to receive such prizes; and it may be added, without wishing to suggest offensive comparisons by the remark, that young botanists, in the social position of gentlemen, would be little likely to become competitors for them. If they should become so, however, with time and money at command, what would be the chances of successful competition on the part of employed gardeners and others able to spare little of either?

As to the prizes for "new species found growing in the United Kingdom," it is to be feared that such prizes will tend to introduce foreign species, quite as much as the other prizes will tend to extirpate native species, unless much caution be used in awarding the medals. HEWETT C. WATSON.

NEW PUBLICATIONS.

English Botany, 3rd edition. Edited by J. T. Boswell Syme, F.L.S., the popular portion by Mrs. Lankester. Vols. I. and II. London: Hardwicke.

We have already (Vol. I. p. 26) devoted a few pages to the explanation of the general method according to which the new edition of 'English Botany' is planned, and, now that the end of the second volume is reached, it seems to be a suitable time to fulfil our promise of returning to the work with a view of speaking more particularly respecting points of detail. The two volumes are made up of fourteen monthly issues, and carry us to the end of *Thalamiflorae*, including *Ilex*, *Montia*, and *Polycarpon*. For the whole of Europe, Nyman's 'Sylloge' enumerates under the subclass rather less than 300 genera, and on the average rather more than 8 species to a genus; and for Britain the 'London Catalogue' makes mention of 89 genera and 269 species, inclusive of several manifest introductions.

As the work proceeds, what indeed was manifest from the beginning becomes fully apparent, how much cause all who are interested in the progress of British botany have to congratulate themselves that the

editorship of the scientific portion of the new series has fallen into the hands of Mr. Syme. He has been so placed that he has had excellent opportunities of studying the plants of different parts of Britain, both in a living and dried state. He knows well the recent Continental Floras, not only Koch, and Fries, and Grenier and Godron, but also Jordan and Boreau, and the beautiful illustrated volumes of Reichenbach. He has studied with care the plants of continental Europe of which he has had dried specimens at command; and he has duly read the 'Cybele Britannica,' and pays it the only kind of compliment which is really worth anything, by habitually using it.

The principal novelty of the book is the adoption, in classifying forms of plants according to their degree of distinctiveness, of an intermediate stepping-stone between the variety and the species of full rank, and it is a plan which has several manifest advantages. The fault of Mr. Bentham's method of treating the British flora is, that by ignoring all forms and combinations of forms which he himself cannot readily define and characterize, he sacrifices real truth of nature for the sake of mere artificial symmetry of classification, and of mere convenience of conventional expression. The fault of Messieurs Jordan and Boreau's plan is, that they place combinations of extremely unequal value upon an equality with one another, and thus they also violate the real truth of nature. It seems to us that the best work which these latter authors have done is one that they have done unconsciously —their labours have helped us very much to understand the real nature of what we call species, their books having especially tended to force into prominence the amount of difference that there is between "species" as differently treated, a point which Mr. Watson had insisted upon so strongly, and elucidated so clearly in the fourth volume of the 'Cybele.' Mr. Syme, as has been explained already, adopts three grades of classification subordinate to genus, which he calls variety, subspecies, and species; his variety being somewhat more than equal to the "species" of the French analysts, his subspecies being nearly equal to the "species" of Babington's 'Manual,' and his species of full rank being considerably less than equal to a "species" of Bentham's 'Handbook;' and the result, as practically expressed in these two volumes is, we think, a more real and fuller expression of the truth of nature in this matter than has been attained by any other author.

It is hardly needful, after what has been already said, to adduce any

further illustrations bearing upon this point. We give in preference a list of the plants which have been drawn afresh or figured for the first time by Mr. J. E. Sowerby for this edition, and by Mr. J. W. Salter, for Vol. V. of the Supplement to Eng. Botany, the plates of which, when necessary, are previously published here.

Thalictrum alpinum.
T. minus.
T. Kochii.
T. saxatile.
Ranunculus heterophyllus.
R. confusus.
R. hederaceus.
R. reptans.
Eranthis hyemalis.
Helleborus fœtidus.
H. viridis.
Aquilegia vulgaris.
Nuphar intermedium.
Papaver Lecoqii.
Chelidonium majus.
Fumaria pallidiflora.
F. muralis.
Raphanus maritimus.
Matthiola incana.
Cardamine hirsuta.
Barbarea arcuata.
B. stricta.
B. intermedia.
Cochlearia anglica.
Draba verna, and subspecies.
Camelina fœtida.
Thlaspi sylvestre.
T. occitanum.
Iberis amara.
Lepidium sativum.
Isatis tinctoria.
Helianthemum Breweri.
Viola Riviniana.
V. Reichenbachiana.
Polygala depressa.
P. austriaca.
Sagina ciliata.
Spergularia rubra.
Claytonia perfoliata.
Cerastium pumilum.
Geranium lucidum.
Oxalis stricta.
Impatiens parviflora.
Hypericum Androsæmum.
H. hircinum.
Rhamnus Frangula.

Besides these, four recent discoveries are described and figured, three of which, *Viola arenaria*, *Sagina nivalis*, and *Hypericum Bœticum* or *undulatum*, have been already introduced to our readers, and the fourth of which, *Brassica (Diplotaxis) viminea*, though said to have been gathered by the Rev. W. W. Newbould in one of the Channel Islands, we have reason for suspecting to be a doubtfully native plant. Of subordinate forms, treated by some authors as species, which Mr. Syme describes, and which have not been previously (at any rate fully) introduced to the attention of British botanists, the following are the principal :—

Name.	***Regarded by Mr. Syme as a variety of—***
Thalictrum riparium, *Jord.*	Thalictrum flavum.
T. Morisoni, *Reich.*	Ditto.
Ranunculus Bachii, *Wirtg.*	Ranunculus fluitans.
R. Steveni, *Andrz.*	R. acris.
R. vulgatus, *Jord.*	Ditto.
R. rectus, *Boreau.*	Ditto.
Ficaria calthæfolia, *Reich.*	R. Ficaria.
Caltha Guerangerii, *Bor.*	Caltha palustris.
Nuphar intermedium, *Led.*	Nuphar lutea.

Helianthemum vineale, *Pers.*	Helianthemum canum.
Polygala ciliata, *Lebel.*	Polygala vulgaris.
Alsine laxa, *Jord.*	Alsine tenuifolia.
A. hybrida, *Vill.*	Ditto.
Hypericum microphyllum, *Jord.*	Hypericum perforatum.
Geranium modestum, *Jord.*	Geranium Robertianum.

The figures of the "critical" groups included in the subclass, as for instance, of the Batrachoid *Ranunculi*, the *Violas* of the *canina* group, the *Thlaspis* of the *alpestre* group, with which in almost every instance great pains seems to have been taken, will materially aid in the identification of the plants. Judging from the specimens we have seen of the Cambridgeshire *Thalictrum*, which is figured under the name of *saxatile*, the peduncles are sometimes as cernuous as in the other British species, and the secondary bracts not invariably entire, so that Wallroth's name of *collinum* would appear to be the one that is properly applicable. Of a tall-branched *Thalictrum*, from the Flintshire station, which Mr. Syme mentions, we have seen an extensive series of specimens, and the carpels are clearly gibbous, and in other respects the plant agrees with Mr. Syme's *minus* var. *montanum*. In authentic specimens of Boreau's *Ranunculus rectus*, the rootstock is quite oblique, and the beak not nearly half as long as the body of the carpel. In Mr. Syme's account of *Papaver Lecoqii*, a misprint of "length" instead of "breadth" seriously mars the description. As regards the colour of the sap, authors are by no means in accordance. M. Lamotte, the original describer, attributes to *P. Lecoqii* sap which turns yellow upon exposure. M. Boreau says nothing about the sap. M. Crepin says that *P. Lecoqii* is the only one of the four segregates that has yellow sap, and upon this Mr. Babington and Mr. Syme ground their nomenclature. But M. Reuter (Cat. Plant. Genev. 2 edit. p. 9) tells us that *P. collinum* has yellow sap, and describes the sap of *P. Lecoqii*, to which he agrees with Boreau in attributing bipinnate stem-leaves, capsule attenuated at the base, and stigmatic rays reaching to the edge of the disk, as greenish at first, and becoming white upon exposure. Of *Violas* of the *odorata* group, M. Jordan describes eighteen species, inclusive of *hirta* and *odorata*, most of them apparently intermediate in character between our well-known British representatives of the two names. *Geranium purpureum*, E. B. S. 2648, Mr. Syme identifies with *G. minutiflorum* of Jordan. *Erodium pilosum*, of Jordan and Boreau, the *Geranium*

pilosum of Thuillier, which has been found by Mr. H. S. Fisher in the neighbourhood of Liverpool, is worthy of further attention. It is well figured in Reichenbach's 'Icones,' and is said to differ mainly from *E. cicutarium* by its invariably and truly bipinnate leaves. We hope on a future occasion, as the work progresses, to return to it again.

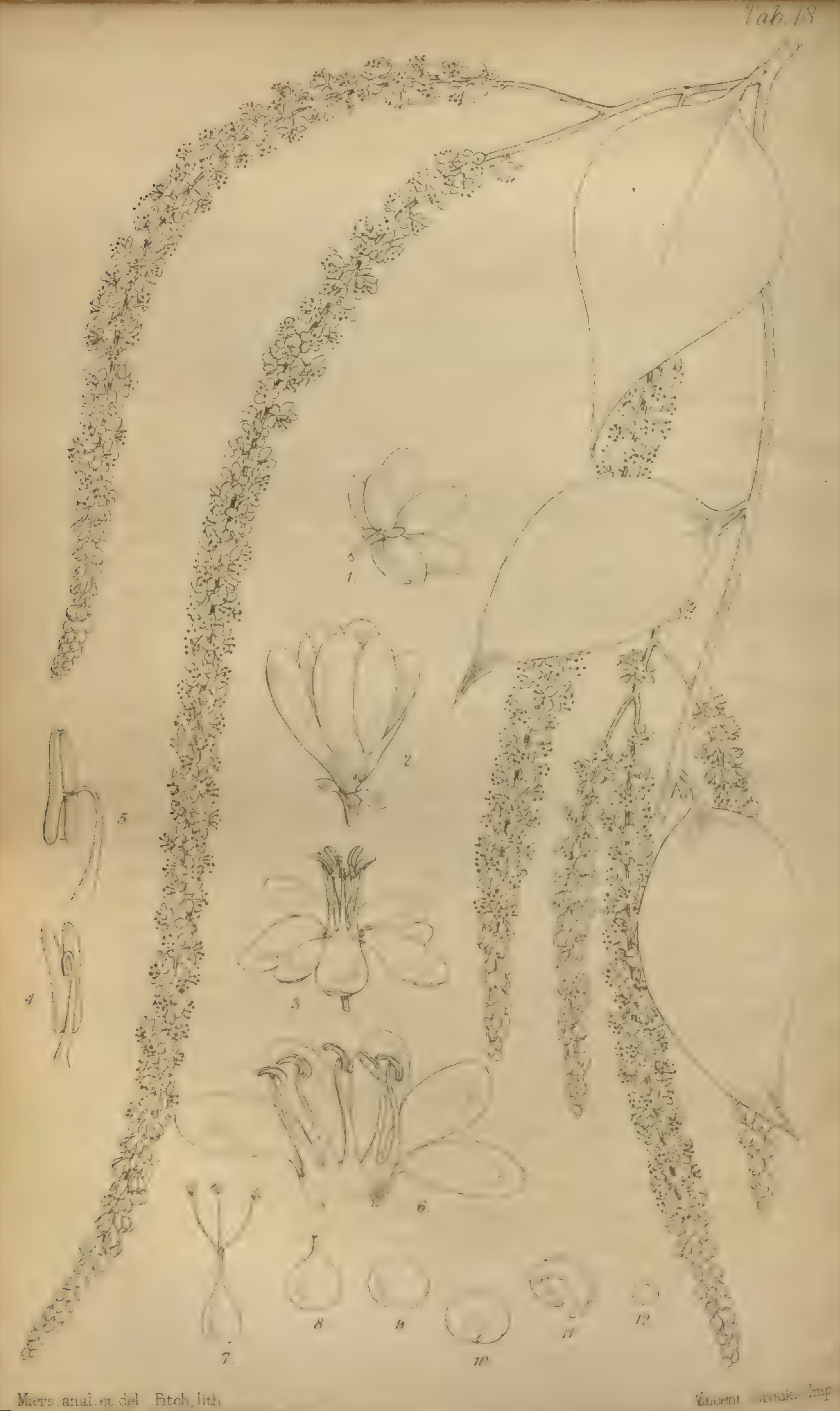
Pinetum Britannicum: a Descriptive Account of all Hardy Trees of the Pine Tribe cultivated in Great Britain. With Facsimiles of original Drawings made for the Work. Edinburgh and London: Private press of Peter Lawson and Son. Folio.

The first three parts of this work have come to hand, and they contain figures and descriptions of *Picea nobilis*, *Pinus Lambertiana*, *Picea Cephalonica*, and *Picea Pinsapo*. Both the plates and the letterpress, especially the latter, are done satisfactorily; and the only inconvenience of which working botanists have to complain is, that the plates are not numbered and the letterpress is not paged consecutively, so that on the completion of the work it will be difficult to find a plant. The dissections on the plates ought also to have been lettered. At the close of the 'Pinetum' a synoptical table will be printed, in which all the species of *Coniferæ* hardy in Great Britain will be classified. We regret not to find the name of the author on the title-page, as it would have imparted to the work a scientific value to which no anonymous publication, however ably executed, can lay claim. His name has been mentioned to us, but as there were probably sound reasons for not making it public, we refrain from repeating it. We shall return to this work after more parts have been issued.

Species Filicum. Part XVII. By Sir W. J. Hooker. London: Dulau and Co.

In this part the distinguished author carries the genus *Polypodium* to the 395th species. The work will be completed in the next part, now almost ready, when we shall have a complete enumeration of this Order of plants, with numerous illustrations of interesting and otherwise unfigured species. We defer till then any lengthened notice of this important publication, which must be in the hands of every one who would do any satisfactory work with Filices.

Tab. 18.



Meers. anal. et del. Fitch, lith.

Vincent Brooks Imp

ON A NEW SPECIES OF BOUSSINGAULTIA.

By John Miers, Esq., F.R.S., F.L.S., etc.

(Plate XVIII.)

The genus *Boussingaultia* was founded, in 1825, by Kunth, on a plant from the Ecuador region, which was then described and figured by him; he placed it in *Chenopodeæ*, pointing out its affinity to *Basella* and *Anredera*. Subsequently the family of the *Basellaceæ* was established by Moquin-Tandon, who placed *Boussingaultia* there, in his suborder *Anredereæ*, recording at the same time two other species from Mexico. All the plants of this family, comprised under six genera, belong to the New World, except those of the genus *Basella*, which is Asiatic. The discovery of a new species of *Boussingaultia*, from Brazil, is therefore interesting, for all the plants above mentioned are confined to the western side of the American continent. It is true that Tweedie sent a plant from Buenos Ayres, supposed to be cultivated, and which was referred to Kunth's type of the genus, but it was probably the plant now about to be described, which forms a fourth species of the genus.

4. *Boussingaultia gracilis*, n. sp.; scandens, glaberrima, ramulis teneribus, subcompressis, angulato-striatis, subflexuosis, dependentibus; foliis obovatis, imo acutis et in petiolum subbrevem canaliculatum decurrentibus, apice acutis et cuspidato-acuminatis, siccis membranaceis et fuscescentibus, utrinque opacis, nervis tenerrimis immersis; racemis axillaribus, glaberrimis, ramosis; ramis longissimis, gracillimis, dense spicatis; pedicellis brevibus, imo uni- apice bibracteatis, filamentis dilatatis subulatis; ovario ovato, 3-sulcato; stylo ultra medium 3-fido, ramis tenuibus, stigmatibus papilloso-globosis.—Brazil. v. s. in Hb. Soc. Reg. Hort.—Prov. S. Paulo (Weir, 486).

The branch is barely a line in thickness, with its internodes $1\frac{1}{2}$–2 inches apart; leaves $1\frac{3}{4}$–2 inches long, 10–14 lines broad, on a petiole 3 lines long; raceme bare at base for the length of $\frac{3}{4}$ inch, whence it throws out 1–4 alternate branches, varying in length from 4–9 inches; these are densely spicate on a very slender rachis, pedicels 1 line long, basal bract 1 line, two apical bracts $\frac{1}{2}$ line long; calyx scarcely 2 lines long, two exterior sepals somewhat shorter than the

five interior sepals, which are placed in a single whorl, and all united at base in an extremely short tube, they are oblong, acute, membranaceous, rotately expanded. The five stamens stand erect, united at base in a ring, which is adnate to the tube of the calyx; filaments submembranaceous, rigidly erect, dilated at base, very slender above, fixed opposite segments of calyx; anthers ovate, cleft at the base to the middle, where they are affixed, recurved in bud, afterwards curved and oscillatory on the apex of the filament. The ovary is $\frac{1}{4}$ line long, 1-locular, with a single erect ovule, and terminated by a slender 3-fid style, the length of the stamens. Fruit a small, indehiscent, subglobular capsule, enclosing a single seed, attached at base, and covered by two distinct integuments; the embryo is cyclically curved round a small mass of farinaceous albumen; the radicle pointing to the base is terete, much narrower, and $\frac{1}{6}$ the length of the two fleshy, incumbent, curved cotyledons.

Explanation of Plate XVIII.

The Plate shows a drawing of *Boussingaultia gracilis, nat. size.*—Fig. 1 is a flower seen from below, to show the relative position of the bracts and two outer segments, *magnified.* Fig. 2. A flower opening. Fig. 3. The same expanded. Fig. 4. A stamen, showing its reversion in bud. Fig. 5. The same expanding. Fig. 6. The calyx cut open, showing its five inner segments and the stamens attached to its short tube. Fig. 7. The ovary, style, and stigmata. Fig. 8. The indehiscent capsule. Fig. 9. The seed extracted. Fig. 10. A longitudinal section of the same. Fig. 11. The embryo extracted. Fig. 12. The small farinaceous albumen, round which the embryo is coiled:—*all equally magnified.*

SYNOPSIS OF THE PHANEROGAMIC FLORA OF SPITZBERGEN.

By A. J. Malmgren.

(*Concluded from page* 147.)

MONOCOTYLEDONEÆ.

Juncaceæ, *De Cand.*

67. *Juncus biglumis*, L.—Scarce as far as Brandywine Bay, on wet soil, covered with humus or moss. At Augusti Bay, on a mountain plateau near the snow-line. In flower at Treurenburg Bay, 6th of July, and with ripe seed, at Lomme Bay, 23rd of August.

68. *Luzula hyperborea*, R. Br. in Parry; Blytt, Norges Flora; *Luzula campestris*, Br. in Scoresby (sec. R. Br. l. c.); Soland. in Phipps (sec. R. Br. l. c.); *Juncus arcuatus*, β, Wbg. Fl. L.; Hooker in Scoresby (sec. R. Br.); *Luzula arcuata*, β, Smflt.; *L. confusa*, Lindeb. Bot. Notis. 1855, p. 9.—This very variable species is common in the north. On rich soil it attains the height of a foot, but it is generally 5–8 inches high. Seven Isl., Nordenskiöld, Brandywine Bay, 1000 feet, and at Magdalena Bay more than 2000 feet above the sea. Treurenburg Bay, in flower July 1st, general in fruit in the end of August.

69. *L. arctica*, Blytt; *L. hyperborea*, Fr., Hrtm.; *L. campestris*, var. *nivalis*, Smflt., Læst. Hrb. Norm. x. 65; "*Luzula hyperborea*, R. Br.," Fr.—Rare, and with scarcely so wide a range as the last. Treurenburg Bay, Lomme Bay, King's Bay, and Ice Sound.

CYPERACEÆ, *De Cand.*

70. *Eriophorum capitatum*, Host., Wbg.; *E. Scheuchzeri*, Hoppe, Hrtm.—Sparingly scattered along all the coasts. Lomme Bay, 200 ft. above the sea; Wide Bay, King's Bay, Ice Sound, and Bellsund.

71. *Carex pulla*, Good.; *C. saxatilis*, L., Hrtm.; *C. vesicaria*, var. *pulla*, Anders. Cyp. Scand. p. 19; Hrb. Norm. n. 74.—Very rare indeed; only at Ice Sound, Advent Bay in September.

72. *C. misandra*, R. Br., Blytt; *C. fuliginosa*, Fr., Anders., Hrtm.; Hooker, Fl. B. Am. (non *C. fuliginosa*, Sternb. et Hoppe); Hrb. Norm. fasc. v. n. 80; Fl. D. 2373.—Blytt rightly observed in his 'Norges Flora' (p. 209), that the *C. fuliginosa* of the Scandinavian, and probably also of the English authors, is not identical with Sternb. and Hoppe's *C. fuliginosa*, found on the South European Alps, which has coarse bristles, spikes of nearly double the length, thicker pedicels, and broader and more erect leaves than the Scandinavian and Spitzbergen species; it is indeed altogether a more luxuriant plant. This is the most common species of *Carex* on the northern coast of Spitzbergen. Treurenburg Bay, 7th of July; Lomme Bay, Cross Bay, and Augusti Bay.

73. *C. glareosa*, Wbg.; Fl. D. 2430.—Very rare, and only found at King's Bay and Advent Bay. This differs from the Scandinavian plant in having only two spikelets. It must, however, be referred to this species because of its narrow and bristly leaves, and the form, and

distinct nerves of the seed-vessels. *C. lagopina*, of Vahl, and *C. Heleonastes* of C. Martin, most probably belong to this species.

74. *C. nardina*, Fr. Bot. Not. 1839, p. 19; Anders.; *C. Hepburni* (Boot), Hook. Fl. Bor. Am. ii. p. 209, tab. 207; Fl. D. 2365; Herb. Norm. ix. 86.—At Treurenburg Bay only, 6th July.

75. *C. rupestris*, All., Anders., Blytt, Fl. D. 2433.—Extremely rare, Treurenburg Bay, 3rd July, Lomme Bay, 24th August, King's Bay.

GRAMINEÆ, *Juss.*

76. *Alopecurus alpinus*, Sm., R. Br.; *A. ovatus*, Horn.; *A. ovatus* β. *muticus*, Smflt.—The spikelet varies in length from being double the length of the glumes to being entirely enclosed within them. Sommerfelt has called the form with short spikelets, var. *muticus*. This is the most common form in Spitzbergen. It is found as far north as Brandywine Bay, on the moss or humus-covered banks at the base of the mountains, and especially under the bird-cliffs. Found also at Augusti Bay, Lomme Bay, Treurenburg Bay, Wide Bay, and other places on the west coast.

77. *Aira alpina*, L.—Rare on the western coast as far as Amsterdam Island, and at Hinlopen Strait (Lomme Bay), but not met with on the northern coast.

CALAMAGROSTIS, *Roth.*

78. *Calamagrostis neglecta*, Ehrh., Anders.; *C. stricta*, Wbg., Hrtm.—Bear Island, Keilhau, not Spitzbergen, as erroneously given by Lindblom. At Ice Sound, Advent Bay, in September. The specimens are 1 ft. high, with a panicle $1\frac{1}{2}$–2 inches long.

79. *Trisetum subspicatum*, P. Beauv., Anders.; *Aira spicata*, L.; *Avena subspicata*, Wbg., Hrtm.—On the west coast as far as Magdalen Bay, not rare; also at Hinlopen Strait, in the interior of Lomme Bay; not yet found on the northern coast.

80. *Hierochloa pauciflora*, R. Br.—Low Island, Parry, according to Hooker.

81. *Dupontia psilosantha*, Rupr. Flor. Samojed. p. 64; Fl. Dan. fig. 2521.—At Bellsund ?, Nordenskiöld; Ice Sound, Sept. 1861.

82. *D. Fischeri*, R. Br.; *Poa pelligera*, Rupr.; *Holcus arcticus*, Smflt.—Rare, on wet mossy spots at the foot of the mountains, as far as Brandywine Bay, Lomme Bay, Augusti Bay, Ice Sound, Bellsund,

Ch. Martens, Treurenburg Bay (Hecla Cove), and Low Island, Parry. In answer to my inquiries, Blytt wrote to me that "*Holcus arcticus*, Smflt., is certainly *D. Fischeri*, R. Br., for I have compared it with an authentic specimen from Melville Island, communicated to me by R. Brown himself."

83. *Poa pratensis*, var. *alpigena*, Fr. Hrb. Norm. ix. n. 93.—Rare, found only at Lomme Bay, King's Bay, and Ice Sound. The specimens are 10 inches high, and resemble in every respect the Scandinavian *alpigena*, except that the top leaf of the stalk is broader and flatter.

84. *P. cenisia* (All.), Fr.; Anders. Gr. Scand. p. 37.—This is the most common *Poa*. It is found both on the west and north coast, extending along the mountain sides up to the snow-line. Seven Island, Nordenskiöld. The principal forms of this variable species are—1. *Poa arctica*, R. Br.; *Poa flexuosa*, Blytt; *P. cenisia*, var. *depauperata*, Fr. Hrb. Norm. iii. 93. Found in the north, and extending to the snow-line. 2. *P. flexuosa*, Wbg.; *P. cenisia flexuosa*, Anders., Hrb. Norm. iii. 24; *P. flexuosa elongata*, Blytt. On rich soil, under the bird-cliffs, up to Brandywine Bay; 1 ft. or more high. 3. *P. flexuosa vivipara*. A luxuriant form of the last variety, with a greenish, compact, and often viviparous panicle. I have observed transition forms between all these; they belong doubtless to the same species. *Poa gelida*, Roemer, specimens of which from Horneman are in the Riks Museum, is a luxuriant form of *P. flexuosa*, Wbg., with rather larger spikelets. This form is found in Spitzbergen.

85. *P. stricta*, Lindeb., Blytt; *P. laxa*, var. *vivipara*, Anders.; *P. stricta prolifera*, Fries, Herb. Norm. xv., n. 94; *P. alpina vivipara*, Vahl, according to Vahl's specimens from Magdalen Bay and Bellsund, in the Museum Kongl. Vet. Akad.; *P. cæsia* (Sm.), J. D. Hook., and *P. cæsia*, var. *vivipara*, J. D. Hook., Proceed. Linn. Soc. vol. i. 1856, p. 118, according to specimens from Beechy Island; *P. laxa*, Hook.—Much confusion exists regarding this extremely variable plant. Smflt. and Vahl make a viviparous form with broad leaves *Poa alpina vivipara*, and as erroneously refer the smaller viviparous form, with softer and narrower leaves, the most common in Spitzbergen, to *P. laxa*, Hänke, var. *vivipara*. Hooker has erroneously referred the Beechy Island plant, which is not always viviparous, to *P. cæsia*, Sm. The specimens from Beechy Island are identical with those in Herb. Norm.

fasc. xv., n. 94, except that they have greener spikelets, and somewhat rougher panicle-branches than the Scandinavian plants, but these characters vary in the Spitzbergen specimens.

This is as common, and has as wide a range as the two former species. It is found on the mountain sides up to the snow-line, and is common at Brandywine Bay.

86. *P. abbreviata*, R. Br.; *P. laxa*, Hänke, Hooker, according to specimens from Beechy Island, determined by Hooker, in Riks Museum.—Treurenburg (Hecla Cove), and Low Isl., Parry; Lomme Bay and Cape Fanshave. Not yet found on the west coast. We cannot, with J. D. Hooker, refer this plant to *P. laxa*, Hänke, for it has a small spike-like panicle, and the leaves are rolled up, bent backwards, often as thin as a thread, and never more than 5 inches long.

87. *P. Vahliana*, Liebm. Fl. D. 2401.—Sparingly at Hinlopen Strait, Treurenburg Bay, and King's Bay.

88. *Glyceria angustata* (R. Br.), Mgr.; *Poa angustata*, R. Br.; *Atropis angustata*, Rupr., Ledeb. Fl. Ross.—Rare, on the west coast, and at Hinlopen Strait. Cape Fanshave, 18th August; Lomme Bay 23rd August. Like *Poa Vahliana*, it grows on gravel mixed with clay, which is soaked by the melting snows.

89. *Catabrosa Vilfoidea*, Anders.—"C. cæspitosa, rigidiuscula; culmo subpollicari, adscendente, dichotome ramoso, basi dense foliato, glaberrimo; vaginis subinflatis, trinerviis, glabris; ligula producta, truncata vel biloba; lamina convoluta, acuta; panicula valde depauperata, ramis geminis inæqualibus, vel sæpius solitariis, aut integris et spicula biflora solitaria terminatis, aut iterum divisis, spiculas tres vel duas gerentibus; glumis inæqualibus, flosculis duplo brevioribus, acutiusculis, subcompressis, interiori majori; paleis inæqualibus, exteriori dorso recto, subenervia, apice oblique truncata; lodiculis acutis, subintegris; staminibus tribus; stigmatibus erectis, elongatis. Hab. in Spitzbergen, loco Augusti Bay dicto, a Doct. Malmgren 1861 lecta.

90. *Catabrosa algida*, (Sol.), Fr., Anders. Bot. Not. 1849, with fig.; *Agrostis algida*, Sol., Wbg., Fl. L., p. 25, tab. i.; *Vilfa algida*, Prin.; *Phippsia algida*, R. Br.—Very general on the coasts and islets, and wherever the melting snow forms pools, or keeps the soil soaked, even up to the snow-line. Walden Isl., Parry, Seven Isl., Nordenskiöld.

Superficially, this little Grass resembles the North American *Vilfa*

depauperata, Torr., described and figured in Hooker's Fl. Bor. Amer. It can however be readily distinguished by the glumes, which are of different sizes and considerably shorter than the flower, and by the spikelet, consisting of two fully-developed flowers. These characters, as well as the general appearance of the inflorescence, show that it is nearly related to the section of *Glyceria*, which, from its few-flowered spikelets, has been separated under *Catabrosa;* and among the members of this genus it is nearest to the North Scandinavian *C. algida*, Fr., but this species has a denser and more tufted growth, broader and blunter leaves, larger panicle, one-flowered spikelet, shorter glumes, and differently-formed pales. Our species, from its reduced spikelets, forms a connecting link between *Glyceria* and *Poa*, and shows also that *Colpodium* forms with these genera so connected a series, that genera can only be separated by artificial characters, and with the greatest difficulty." Andersson.

91. *Festuca hirsuta*, Fl. D. 1627; *F. rubra*, var. *arenaria* (Osb.), And, Wbg.; *F. rubra hirsuta minor*, Blytt.—Sparingly along the coasts on sandy ridges. Lomme Bay, Norse Island, Cross Bay, King's Bay, and Ice Sound.

92. *F. ovina*, L., var. *vivipara*, Horn.—On the west coast and about Hinlopen Strait; general at Lomme Bay, but elsewhere somewhat rare. Var. *violacea*, Gaud.; var. *alpestris*, And.—Hinlopen Strait, Lomme Bay.

93. *F. brevifolia*, R. Br.—Treurenburg Bay, Hecla Cove, Parry; Hinlopen Strait, sparingly, up to 500 feet above the sea.

Of the 93 species of Phanerogams hitherto found in Spitzbergen, 73 are found on the north coast under lat. 80° N. ($79\frac{1}{2}$–80° 40′) and 80 on the west coast, lat. 76°·5–79°·5 N. Although the west-coast species exceed those from the north coast only by seven, there are in the character of these two coast-floras such essential differences, that each must be considered for itself, as an expression of highly different relations of clime and temperature.

On the northern coast the ice lies in the smaller bays till July, and masses of drift-ice pitch along the coasts all July and during great part of August. It is only at the end of this month, or early in September, that the sea is completely free from ice. The west coast, on

the other hand, is accessible to vessels in May as far north as lat. 79°·5 N., and the sounds are in June free from fixed ice.

That the early disappearance of ice on the west coast favours vegetation is evident from the fact that 20 species, all save one belonging to the North European flora, have been found on the west, which have never been met with on the north coast. The flora of the north coast has, on the other hand, 13 species which have not been found on the west, and 6 or 7 of which are known elsewhere only from Melville Island and the west of Parry Island, in North America. Nothing almost is known of the south and south-west coasts; but the relatively small difference between the number of species in the north and in the west, the increasing additions of southern species on the west, and the great climatic differences between the two districts, make it probable that many interesting southern species will yet be found in the south and south-west.

The species peculiar to the west coast,—all of which, except *Ranunculus arcticus*, are North European,—are :—

Eutrema Edwardsii, *R. Br.*
Cardamine pratensis, *L.*
Arabis alpina, *L.*
Ranunculus glacialis, *L.*
R. arcticus, *Rich.*
Arenaria ciliata, *L.*
Ammadenia peploides, *Gm.*
Potentilla maculata, *Pourr.*
Chrysosplenium alternifolium, *var.* tetrandrum, *Th.*, *Fr.*
Arnica alpina, *Murr.*
Taraxacum palustre, *Sm.*
Nardosmia frigida, (*L.*), *Cass.*
Polemonium pulchellum, *Ledeb.*
Mertensia maritima, *L.*
Empetrum nigrum, *L.*
Salix reticulata, *L.*
Carex pulla, *Good.*
C. glareosa, *Wbg.*
Calamagrostis neglecta, *Ehrh.*
Dupontia psilosantha, *Rupr.*

Of the 80 western species, 76 are found along the whole extent of the coast between lat. 78°–79·5° N., especially at Ice Sound, King's Bay, Cross Bay, and Magdalena Bay. 4 species are met with only more to the south, viz. *Eutrema Edwardsii*, *Empetrum nigrum*, and *Salix reticulata*, at Bellsund, lat. 77·5° N., Vahl and C. Martins, and *Ranunculus glacialis* exclusively on the Sydkap, lat. 176·5° N., Keilhau.

Of the 73 native plants, 60 are found also on the west.
The 13 peculiar to the north are :—

Ranunculus hyperboreus, *Rottb.*
Parrya arctica, *R. Br.*
Draba glacialis, *Adams* (*non Smflt*).
D. micropetala, *Hook.*
D. pauciflora, *R. Br.*
Wahlbergella affinis, *Fr.*
Arenaria Rossii, *R. Br.*
Carex misandra, *R. Br.*
C. nardina, *Fr.*
Poa abbreviata, *R. Br.*
Hierochloa pauciflora, *R. Br.*
Catabrosa vilfoidea, *Ands.*
Festuca brevifolia, *R. Br.*

Of these, the following have not been found in Greenland, nor in the Arctic regions of the Old World: *Parrya arctica*, *Draba pauciflora* (although cited for the Taimyrland), *Draba micropetala*, *Arenaria Rossii*, *Poa abbreviata*, *Hierochloa pauciflora*, and *Catabrosa vilfoidea*. But, excepting *Catabrosa*, which is new, they are all known from Arctic America beyond lat. 74° N., and were gathered, with the exception of *D. micropetala*, by Parry on Melville Island, lat. 75° N.

It has been asserted* that the snow-line north of lat. 78° N. descends to the sea-level, but that is not the case on the coasts of Spitzbergen. The flora at lat. 78° N. consists of 89 species of Phanerogamia, and at least 250 species of Cryptogamia, viz. 70–80 mosses, 30 seaweeds, 150 lichens, and 10–15 fungi; and the vegetation is so vigorous, that numerous herds of reindeer there find rich pasture.† At least 29 species of phanerogamia are found on the mountains of the north coast (79° 5–80°·5) below the snow-line, which here rises to 600–1000 feet above the sea-level. Blomstrand found a plentiful and vigorous vegetation more than 2000 feet above the sea at Magdalena Bay (79°·5); and at Brandywine Bay (80° 24′) the mountain sides were covered with a not very scanty vegetation more than 1000 feet above the sea; and in this locality, on the moss-covered terraces below the bird-cliffs species of *Cochlearia* and *Ranunculus* were found a foot in height. The snow-line then does not descend to the sea-level on the western or northern coasts of Spitzbergen, but must be drawn at lat. 80° N. at least 800 if not 1000 feet above the sea.

The following plants are found on the north coast, from 600–1000 feet above the sea. A star is prefixed to those plants which were found near the snow-line.

* By Durocher in "Voyage en Scandinavie, etc.," publ. par Gaimard, 'Géographie Physique,' vol. i. part 2, p. 12.

† It is said that the Norwegians, in the summer of 1861, killed at Ice Sound alone (lat. 78° N.) from four to six hundred reindeer.

Ranunculus sulphureus, *Sol.*
R. pygmæus, *Wbg.*
*Papaver nudicaule, *L.*
*Cardamine bellidifolia, *L.*
*Draba alpina, *L.*
*D. glacialis, *Ad.*
D. pauciflora, *R. Br.*
D. nivalis, *Lilj.*
D. Wahlenbergii, *Hn.*
*Cochlearia fenestrata, *var.* prostrata.
Alsine rubella, *Wbg.*
*Arenaria Rossii, *R. Br.*
Stellaria Edwardsii, *R. Br.*
*Cerastium alpinum, *L.*
Potentilla emarginata, *Pursh.*
*Saxifraga oppositifolia, *L.*
*S. cæspitosa, *L.*
*S. rivularis, *var.* hyperborea.
*S. cernua, *L.*
*S. nivalis, *L.*, *var.* tenuis.
*S. flagellaris, *St.*
*Oxyria digyna, *Campd.*
*Salix polaris, *Wbg.*
*Juncus biglumis.
*Luzula hyperborea, *R. Br.*
Luzula arctica, *Bl.*
*Carex misandra, *R. Br.*
*Poa cenisia, *All.*, *var.* arctica.
P. stricta, *Lindeb.*

Of the 93 plants of Spitzbergen, 81 are found also in Greenland. As, however, the ocean streams which wash the shores of Greenland produce very different climatic conditions on the western and eastern coasts, and as the flora of the western coast is much better known than that of the eastern, it is necessary to compare the plants of each coast separately with those of Spitzbergen. Lange* enumerates 298 species from the western coast, but only 62 species are known from the eastern coast. In Lange's list, which contains the plants found between Cape Farewell, lat. 60° N., and Upernavik, lat. 72° 48′ N., the following 17 Spitzbergen species are wanting,—

Ranunculus glacialis.
R. arcticus.
Parrya arctica.
Draba micropetala.
D. pauciflora.
D. glacialis.
Dryas octopetala.
Arenarii Rossii.
Chrysosplenium alternifolium, *var.* tetrandrum.
Saxifraga hieracifolia.
Nardosmia frigida.
Polemon. pulchellum.
Hierochloa pauciflora.
Dupontia Fischeri.
Poa abbreviata.
Glyceria angustata.
Catabrosa vilfoidea.

In the catalogues of Inglefield's, Sutherland's,† and Kane's‡ plants,

* "Oversigt over Grönland's Planter," in the Appendix to Rink's work on Greenland.

† Inglefield's 'Summer Search' and Petermann's Geogr. Mittheil. 1856, pp. 50, 51. Sir W. J. Hooker prepared the lists of Inglefield's and Sutherland's plants, which were collected in 1852 on Bushman Island, and at Wolstenholme and Wallfish Sounds. It is extraordinary that *Vaccinium Vitis-Idæa* is here recorded for Bushman Island in lat. 76·4° N.

‡ Kane's 'Arctic Explorations,' vol. ii. pp. 442–467. The botanical appendix is by E. Durand.

collected on the western coast further north than lat. 76° N., 55 species are enumerated, and among these are *Draba micropetala* and *Dryas octopetala*, thus reducing the number of Spitzbergen plants wanting on the western coast of Greenland to only 15 species.

The plants collected by Scoresby and Sabine on the eastern coast, between lat. 70°–76° N., amounting to about 62 species, supply us with 4 more of these 15 species, viz. *Ranunculus glacialis*, *R. arcticus*=*? R. auricomus*, Hook., *Polemonium pulchellum*, and *Glyceria angustata*.

We may conclude from this comparison that the flora of the eastern coast of Greenland, when better known, will be found to correspond more with the flora of Spitzbergen than that of the western coast.

The flora of Spitzbergen contains 69 species that are found also in northern Scandinavia. Of the remaining 24 not found in Scandinavia, 5 are found east of the White Sea, in the land of the Samojedes* and on Nova Zembla,† and 6 more in the Taimyrland,‡ lat. 73½°–75½° N. But all the 24 species, excepting *Poa Vahliana*, *Catabrosa vilfoidea*, and *Dupontia psilosantha*, are found in the islands of Arctic America. The Spitzbergen species not found in Scandinavia are:§—

**Ranunculus arcticus.	Parrya arctica.	**Alopecurus alpinus.
*Eutrema Edwardsii.	Arenaria Rossii.	Hierochloa pauciflora.
**Braya purpurascens.	*Stellaria Edwardsii.	Glyceria angustata.
**Draba glacialis.	Potentilla pulchella.	Catabrosa vilfoidea.
D. micropetala.	P. emarginata.	Poa abbreviata.
**D. pauciflora.	**Saxifraga flagellaris.	*Dupontia Fischeri.
D. arctica.	Tarax. phymatocarpum.	*D. psilosantha.
D. corymbosa.	*Polemon. pulchellum.	Festuca brevifolia.

Mittendorff's 'Florula Taimyrensis' contains 124 species of Phanerogamia collected in the region around the Taimyr river, in lat. 73½°–75° 36′ N.; of these, 53 are found in Spitzbergen. The remaining 40 Spitzbergen plants are chiefly North European and Greenland, but some are exclusively North American.

* Ruprecht's 'Flora Samojedorum.'

† 'Bulletin Scientifique,' iii. pp. 171–191. Baer enumerates only forty-seven species, although he estimates (p. 105) the number of phanerogamia found by him on Nova Zembla at about 90 species. 12 of the 47 species are not found in Spitzbergen.

‡ Trautvetter's "Florula Taimyrensis Phænogama" in Middendorf's 'Sibir. Reise,' vol. i. part 2.

§ A single star is prefixed to the species found in the land of the Samoyedes, and two to those known in Taimyrland.

The islands around Lancaster Sound and Barrow Straits, and those north of Melville Sound and Banks's Strait, have a flora of 83 known species of Phanerogamia,* and of these 58 are found in Spitzbergen. They are, almost without exception, north coast plants, and to them belong the greater part of the species which are peculiar to the north coast and which are not found on the west. On the other hand, the 35 species which are not found in the North American islands, belong, with few exceptions, to the North European flora, and almost all the species peculiar to the west and not found on the north coast are included in this number. These 35 are :—

Ranunculus glacialis.	Ammadenia peploides.	Luzula arctica.
R. pygmæus.	Stellaria humifusa.	Carex pulla.
Cardamine pratensis.	Potentilla maculata.	C. glareosa.
Arabis alpina.	P. emarginata.	C. rupestris.
Draba arctica.	Saxifraga hieracifolia.	C. nardina.
D. corymbosa.	S. aizoides.	Calamagrostis neglecta.
D. hirta.	Erigeron uniflorus.	Dupontia psilosantha.
D. nivalis.	Tarax. phymatocarpum.	Aira alpina.
Wahlbergella affinis.	Nardosmia frigida.	Poa Vahliana.
Sagina nivalis.	Polemon. pulchellum.	P. alpigena, *Fr.*
Alsine biflora.	Mertensia maritima.	Catabrosa vilfoidea.
Arenaria ciliata.	Empetrum nigrum.	

The following conclusions naturally arise out of these comparisons of the plants of Spitzbergen with those of other polar regions :—

1. The flora of Spitzbergen is richer in species than any other arctic region having the same latitude. The comparatively mild climate produced by the Gulf Stream is undoubtedly the cause of this. The observations made by our expedition clearly showed that it not only washed the western shores, but during part of the year was perceptible on the northern coasts.

* I have obtained this number by comparing the catalogues of plants which the following English explorers brought home :—

Melville Island (lat. 75° N., long. 111° W.). Parry, in 1819–20, obtained 67 species, which were determined by R. Brown and published in the Appendix to Parry's First Voyage.

Assistance Harbour (lat. 75° 40′ N., long. 94·5° W.). Penny and Sutherland brought 31 species in 1850, which were determined by W. J. Hooker.

The shores of Lancaster Sound and Wellington Channel (lat. 74°–79° N.). Lyall, of Belcher's Expedition, 1852–54, brought 46 species, which were determined by J. D. Hooker, Proceed. Linn. Soc. 1856.

Port Kennedy (lat. 72° N., long. 94° W.) and Pond's Bay (lat. 72° N., long. 80° W.). Walker, in M'Clintock's last Franklin Expedition, collected 52 species, which were determined by J. D. Hooker, Proceed. Linn. Soc. 1860.

2. The large number of species common to Spitzbergen and Greenland shows that the Spitzbergen flora is most nearly related to that of Greenland.

3. The flora of the north coast of Spitzbergen (lat. 80° N.) is very different from that of the west coast, and is most nearly related to the flora of the islands in Lancaster Sound, Barrow's Strait, and Melville Sound (lat. 74° N.), the two having a nearly equal number of species, and almost 70 per cent. of them common to both.

4. A large number of southern species appear in the flora of the west coast, giving it a North European character; but it is nearer the arctic flora east of the White Sea than to that west of it.

The Spitzbergen group of islands, situated between lat. 76·5°–81° N. and long. 9°–22° E., consists of several small and three large islands,—Spitzbergen proper, North-East Island, and Stans Foreland. North-East Island is separated from Spitzbergen proper by Hinlopen Strait, and is the principal island in the northern part of the Spitzbergen group; Stans Foreland lies furthest to the south-east, and is separated from Spitzbergen proper by the Storfjord on the west and Walter Thymen's Sound on the north. Spitzbergen proper is a mountainous island; on the west coast the mountains reach a height of 2000–4000 feet, but on the north and north-east coasts and at Hinlopen Strait only 1000–2000 feet. Sounds, some miles in length, penetrate Spitzbergen proper and North-East Island.

The interiors of Spitzbergen proper and North-east Island are covered with immense connected masses of snow and ice, which never melt, and which, in the form of splendid glaciers, in some places reach the coast and slope into the sea.

The summer's heat melts the snow and fits the soil for its scanty vegetation only on a narrow strip of land which stretches along the coast between the sea and the nearest mountain ridge. The mountains seldom rise precipitously from the sea, there is generally such a narrow terrace of about one-eighth to half a mile in width. Its composition and the subfossil whale-bones and mollusca contained in the uppermost bed of gravel, which is 50 to 150 feet above the sea, show that this ledge is an old seashore, and that Spitzbergen is gradually rising above the sea. This narrow ledge, of so comparatively recent a geological age, supports the great proportion of the vegetation; only a third of the species are found on the north coast at a greater height than 300 feet above the

sea. The flora of Spitzbergen must consequently also be comparatively recent and still continuing to increase.

The coast land is often in terraces rising one above another. It is composed generally of compact gravel and sand, with imbedded pebbles. The vegetation on the terraces is very scanty, consisting almost exclusively of solitary individuals, occasionally a few growing together, of *Saxifraga oppositifolia*, *S. cernua*, *S. cæspitosa*, *Papaver nudicaule*, *Drabæ*, *Alsine rubella*, *Carex misandra*, etc. On a closer examination, one finds here and there a species of moss, and the larger stones are generally covered with different crustaceous lichens; but the eye seeks in vain for a green spot to rest on, everywhere the soil is grey and barren.

Occasionally the strip of coast land forms a gently sloping plain of considerable breadth, or the terraces have level plains, over which the snow-water slowly flows, depositing the mud and clay with which it is charged and forming marshy places, which are covered with a luxuriant moss-vegetation. In such places grow *Eriophorum*, *Juncus*, *Dupontia*, *Saxifraga Hirculus*, *S. rivularis*, etc.

Nearer the base of the mountains the ground is more sloping and is kept moist by the melting snow, which brings with it sufficient mud to form a suitable soil for vegetation. The heat of the sun is also more powerful, because of the sloping nature of the ground, and the mountains form a protection against the chilling winds. Everything, indeed, is suited to cover these rising grounds with the most luxuriant vegetation in Spitzbergen. And it is especially rich, green, and variegated when the summits of the overhanging cliffs or mountains are tenanted as they often are, by thousands of birds.* In such places *Ranunculus sulphureus* grows more than a foot high; one can wade up to the knee in *Cochleariæ* and *Cerastia*; *Saxifraga nivalis*, *S. hieracifolia*, *Pedicularis*, and *Oxyria*, grow much larger than usual; *Luzula hyperborea*, *Alopecurus*, and *Dupontiæ* spring luxuriantly from the green mossy carpet; and so vigorous and large are *Poa cenisia* and *P. stricta*, that it is difficult to recognize them. But it is not the Grasses or the flowering plants that form the continuous green covering which is spread around the base of the mountains. This is produced by a few species of Mosses, chiefly of the genera *Hypnum* and *Aulacomnium*. It is said

* *Uria Grylle*, *U. Brünnichii*, *Mormon arcticus*, *Mergulus Alle*, *Larus glaucus*, *L. tridactylus*, and *Procellaria glacialis*.

that continuous coverings of grass are to be met with around the sounds of the south and south-west coasts; I never saw any in the north.

Such oases in the cold desert of snow and bare rock are rare at lat. 80° N., and are only found where the rocks are granite, gneiss, or slate. The most northern oasis I saw was on the north side of Brandywine Bay (lat. 84° 24′ N.), at the base of a granite and hyperite mountain, inhabited by *Procellaria glacialis*, *Uria Brunnichii* and *U. Grylle*. The middle of the west coast of North-East Island and the islets in the northern portion of Hinlopen Straits, which consist of chalk without fossils, are almost destitute of vegetation. It was rare to find in these localities a single specimen of *Papaver*, *Saxifraga cernua*, or *Cochlearia*, plants which thrive where nothing else will grow. Even Lichens, which need nothing except air, water, and a little sunshine for their growth, were almost entirely absent, and not a green spot of moss relieved the whiteness of these fields of broken chalk.*

In the southern portion of Hinlopen Strait (lat. 79° 30′ N.), where the islets are composed of hyperite, and the coasts of enormous beds of chalk with fossils 1000 feet thick, capped with a bed of hyperite, there was more vegetation than in the chalky region to the north, but this was scanty compared with the north and north-west coasts, where the rocks are granite, gneiss, sandstone, and slate. No doubt the Arctic climate, which prevails throughout the whole year at Hinlopen Straits, affects the vegetation. The mountains, which rise abruptly from both sides of the Straits, are covered by an unbroken mass of ice and snow, which at several places descends as glaciers into the sea. Masses of drift-ice are tossed to and fro by the ebb and flow of the tide throughout the whole year, and these, with the enormous blocks of freshwater-ice broken off from the glaciers, keep the temperature continually low. That, even under circumstances so unfavourable the sun has a wonderful effect on vegetation, I observed in Augusti Bay, which runs from Hinlopen Straits into the southern part of North-East Island. A hyperite mountain, 600–800 feet high, rises on the northern side of this bay. Between this and the sea there stretches a

* This total want of vegetation is not owing to climatic conditions, but to the nature of the soil, which consists entirely of crumbling carbonate of lime. Wherever a piece of gneiss or clay-slate penetrates the chalk, a varied though scanty vegetation makes its appearance.

narrow ledge of coast several hundred yards wide. The mountain rises gradually, its sloping surface has a southern aspect, and it is kept continually moist by water from the melting snow above. Immense glaciers guard it on either side, and it is covered by the eternal snows above. Nevertheless, the sloping surface is covered with a verdant carpet of moss, through which rose in great beauty and abundance the following plants:—*Ranunculus sulphureus*, *Saxifraga Hirculus* (which is found as far south as Skåne), *S. rivularis*, *Cerastium alpinum*, *Pedicularis*, *Polygonum*, *Oxyria*, *Salix polaris*, *Dupontia Fischeri*, *Poa cenisia*, *Juncus* etc. Here also on the gravel were flowering *Saxifraga nivalis*, *S. flagellaris*, *S. cæspitosa*, several *Drabæ*, *Cochlearia*, *Alsine rubella*, *Arenaria Rosii*, etc. Indeed, the common Spitzbergen plants were flourishing here, and on the 1st of August were in flower, though the whole space was only some hundred square yards in extent, and was surrounded on all sides by ice and snow.

The Spitzbergen Phanerogamia are all perennial, and have a tendency to grow in small tufts. It is well known that organic substances decay very slowly in the Arctic regions. A wooden grave-cross, raised half a century ago, looks as though it were of yesterday; and the dry remains of the previous year's growth of plants stand almost unchanged beside the new shoots of the perennial root. One may indeed almost say that stones and minerals decay more speedily in these regions than organic substances. But why are the plants all perennial? The reason is obvious. It entirely depends, so to speak, on wind and weather whether a plant can produce ripe seed during the short summer. No doubt they generally do so, but if in any year they failed, plants having an annual root must, of necessity, be lost, while the continued existence of the species with perennial roots would be secured.

ON PLANTS PRODUCING DOUBLE FLOWERS.

By Berthold Seemann, Ph.D., F.L.S.

Some years ago I stated in the 'Gardeners' Chronicle' that while plants producing double flowers abounded in the northern hemisphere of our globe, not a single species was known from the southern,

with the exception of *Rubus rosifolius*, the geographical range of which was ill defined. This statement requires some modification. The bulk of the plants producing double flowers is undoubtedly indigenous to the northern hemisphere; in Polynesia and the whole of Australasia not a single species with double flowers has turned up; but there are in South Africa and South America at least a few plants, the stamens of which are converted into petals. It is impossible to say whether the absence of double flowers from Polynesia and Australia is owing to the fact that there are no observers in those parts who at once seize and transplant them into a garden, or whether they really never occur. In Europe double flowers are not unfrequently found wild; in wet seasons double *Ranunculi* are by no means uncommon, and Dr. Landerer, of Athens, has pointed out to me the abundance of double Poppies in Greece. Civilized man having taken a peculiar fancy to these products, they are safely lodged in garden and greenhouse, wherever they spring up, and hence all countries longest or most highly civilized have, as the case now stands, supplied the greatest number of double flowers, China and Japan boasting of the most perfect of all, the Camellias.

The succeeding list, from which the *Compositæ* and other spuriously double flowers, such as *Viburnum* and *Hydrangea*, have been excluded, has been some years in preparation, and has been augmented by additions from various botanical friends. I intended to make it the basis of an exhaustive paper on the subject, but for some time I shall be unable to carry out this intention. However, as no more complete list has as yet been drawn up, and as several friends wish to see it printed, I now beg to submit it. The whole number of plants with double flowers I have collected amounts to 279 species,—234 Exogens, and 45 Endogens. Amongst the former we have 166 Polypetalæ, 66 Monopetalæ, and, strange to add, 2 Apetalæ (*Laurineæ*). As I intend to pursue the subject further, any addition to my list will be highly acceptable.

Ranunculaceæ.

Clematis Viticella, *Linn.* Europ. austr.
C. florida, *Thunb.* Japonia.
C. Fortunei, *Moore.* Japonia.
C. patens, *Dcne.* Japonia.
Anemone Japonica, *Sieb. et Zucc.* Japonia.

A. coronaria, *Linn.* Europ. austr., Asia min.
A. Pavonina, *Lam.*; (hortensis, *Linn.*, var.) Gallia.
A. palmata, *Linn.* Afr. bor., Lusitania, Hispania.
A. nemorosa, *Linn.* Europa, Amer. bor., Sibiria.
A. sylvestris. *Linn.* Europa austr., Sibiria.
Hepatica triloba, *Chaix.* Europa.
Ranunculus bulbosus, *Linn.* Europa, Amer. bor.
R. repens, *Linn.* Europa, Sibiria, Amer. bor.
R. acris, *Linn.* Europa, Sibiria.
R. aconitifolius, *Linn.* Europa.
R. gramineus, *Linn.* Italia, Gallia, Lusitania, Helvetia.
R. bullatus, *Linn.* Europ. austr.
R. Asiaticus, *Linn.* Oriens.
Ficaria ranunculoides, *Mœnch.* Europa.
Thalictrum anemonoides, *Michx.* (*Anemone thalictroides*, Linn.; *A. uniflora*, Pursh.) Amer. sept.
Caltha palustris, *Linn.* Europa, Asia, Amer. sept.
Trollius Europæus, *Linn.* Europa.
T. Nepalensis, *hort.* Nepalia.
Nigella Damascena, *Linn.* Reg. Medit.
Aquilegia vulgaris, *Linn.* Europa.
A. Canadensis, *Linn.* Amer. sept.
Delphinium Ajacis, *Linn.* Tauria, Europ. austr.
D. grandiflorum, *Linn.* Sibiria, Volga. (*D. azureum*, Michx.) Amer. sept.
D. Consolida, *Linn.* Europa, Amer. sept.
D. cheilanthum, *Fisch.* Sibiria.
D. elegans, *De Cand.* Amer. bor.?
Adonis autumnalis, *Linn.* Europ.
A. vernalis, *Linn.* Europ., Asia.
Pæonia Moutan, *Sims.* China, Japonia.
P. officinalis, *Retz.* Europa.
P. tenuifolia, *Linn.* Tauria.
P. albiflora, *Pall.* Sibiria.
P. paradoxa, *Andr.* Europ. austr.

Nymphæaceæ.

Nelumbium speciosum, *Willd.* Africa, Asia.

Berberidaceæ.

Berberis, sp. cult. (Dr. Masters !)

Papaveraceæ.

Papaver Rhœas, *Linn.* Europa.
P. bracteatum, *Lindl.* (*P. orientale*, Linn.). Russia.
P. somniferum, *Linn.* Europ. austr., Asia min., Ægyptus.
Chelidonium majus, *Linn.* Europa, Asia.
Sanguinaria Canadensis, *Linn.* Amer. sept.
Podophyllum peltatum, *Linn.* Amer. sept.

Cruciferæ.

Mathiola incana, *R. Brown.* Reg. Medit.
M. glabrata, *De Cand.* Patria ?
M. annua, *Sweet.* Europ. austr., Syria.
Cheiranthus Cheiri, *Linn.* Europa.
Iberis umbellata, *Linn.* Europ. austr.
Cardamine pratensis, *Linn.* Europa, Asia, Africa, America.
Hesperis matronalis, *Linn.* Europa, Sibiria.
Barbarea vulgaris, *R. Brown.* Europ., Oriens.
Sinapis arvensis, *Linn.* Europ.
Brassica oleracea, *Linn.* Europ.

Cistineæ.

Helianthemum variabile, *Spach.* Europa, Afr. bor.

Violaceæ.

Viola odorata, *Linn.* Europa, Sibiria.
V. grandiflora, *Linn.* Europa.

Caryophylleæ.

Dianthus barbatus, *Linn.* Gallia, Germania.
D. Chinensis, *De Cand.* China.
D. Poiretianus, *Seringe.* Patria ?
D. Caryophyllus, *Linn.* Gallia, Italia.
D. arboreus, *Linn.* Creta.
D. hybridus, *auct.* Patria ?
D. corymbosus, *Sib.*, *Sm.* Asia min.
D. plumarius, *Linn.* Europa, Sibiria, Amer. sept.
D. deltoides, *Linn.* Europ.

Saponaria officinalis, *Linn.* Europa.
Lychnis sylvestris, *Schkr.* (*L. dioica*, Linn.). Europa.
L. coronaria, *Desv.* Tauria, Europ. med.
L. Flos-cuculi, *Linn.* Europa.
L. viscaria, *Linn.* Europa.
L. Chalcedonica, *Linn.* Japonia, Asia min.
Silene inflata, *Sm.*; *var.* maritima, *De Cand.* Europa.

Alsineæ.

Sagina procumbens, *Linn.* Europa.

Malvaceæ.

Hibiscus Rosa-Sinensis, *Linn.* Ind. orient.
H. flavescens, *Cav.* China ?
H. alba, *Hook.* China ?
H. mutabilis, *Linn.* Ind. orient.
H. Syriacus, *Linn.* Syria, Carniola.
Althæa rosea, *Cav.* Oriens, Caucasia.
Malva rotundifolia, *Linn.* Europa.

Hippocastaneæ.

Æsculus Hippocastanum, *Linn.* Europa, Amer. sept.

Geraniaceæ.

Geranium pratense, *Linn.* Europa, Sibiria.
G. sylvaticum, *Linn.* Europ.
Pelargonium zonale, *Willd.* Africa, austr.
Tropæolum majus, *Linn.* Peruvia.
T. minus, *Linn.* Peruvia.
Oxalis cernua, *Thunb.* Pr. Bon. Sp.
Impatiens Balsamina, *Linn.* Ind. orient.

Ternstræmiaceæ.

Camellia reticulata, *Lindl.* China.
C. Sasanqua, *Thunb.* China.
C. Japonica, *Linn.* Japonia.
Thea maliflora, *Seem.* Japonia ?

Aurantiaceæ.

Citrus Aurantium, *Linn.* Asia, Europ. austr.

Papilionaceæ.

Trifolium repens, *Linn.* Europ., Am. mer.
Medicago, sp. (Dr. Masters !)
Ulex Europæus, *Link.* Europa.
Spartianthus junceus, *Linn.* Europ. austr.
Clitoria Ternatea, *Linn.* Ind. or., Arabia.
Orobus visciodes, *De Cand.* Croatia, Carniola.
O. vernus, *Linn.* Europa.
Genista tinctoria, *Linn.* Europa.
G. Sibirica, *Linn.* Sibiria.
G. scoparia, *Lam.* (*Cytisus scoparius*, Link). Europa.
Cytisus albus, *Link.* Lusitania.
Anthyllis Vulneraria, *Linn.* Europ.
Coronilla, sp. (Dr. Masters !)
Lotus corniculatus, *Linn.* Europa.

Rosaceæ.

Rosa lutea, *Mill.* Europa.
R. cinnamomea, *Linn.* Europa, Amer. sept.
R. spinosissima, *Linn.* Asia med.
R. Carolina, *Linn.* Amer. sept.
R. villosa, *Linn.* Europa, Asia med.
R. centifolia, *Linn.* Oriens ?
R. Damascena, *Linn.* Syria.
R. rubiginosa, *Linn.* Europa, Asia med., Amer. sept.
R. moschata, *Ait., Mill.* Madeira, Afr. bor.
R. canina, *Linn.* Europa.
R. alba, *Linn.* Europa, Caucasia.
R. Indica, *Linn.* China.
R. nivea, *De Cand.* China.
R. Eglanteria, *Linn.* Europa.
R. Gallica, *Linn.* Europa, Caucasia.
R. pimpinellifolia, *Linn.* Europa, Asia med.
R. Banksiæ, *R. Brown.* China.
R. sulphurea, *Ait.* Oriens.
Rubus fruticosus, *Linn.* Europa.
R. rosifolius, *Smith.* Ins. Maurit., Ind. orient.
R. corylifolius, *Smith.* Europ.

Kerria Japonica, *De Cand.* Japonia.
Spiræa Filipendula, *Linn.* Europa.
S. Ulmaria, *Linn.* Europa.
S. prunifolia, *Sieb. et Zucc.* Japonia.
S. Reevesii, *Lindl.* China.
S. strobilacea, *Sieb. et Zucc.* Japonia.
Fragaria vesca, *Linn.* Europa, Amer. bor.
Potentilla alpestris, *Hall fil.* Europa.
P. reptans, *Linn.* Europa, Asia.
P. Tormentilla, *Schrank.* Europ. Asia.

Pomaceæ.

Cratægus Oxyacantha, *Linn.* Europa.
C. Crus-galli, *Linn.* Am. sept.
Cydonia Japonica, *Pers.* Japonia.
Pyrus communis, *Linn.* Europa.

Amygdaleæ.

Amygdalus Persica, *Linn.* Persia.
A. communis, *Linn.* Mauritania.
Prunus domestica, *Linn.* Europa.
P. spinosa, *Linn.* Europa, Amer. sept.
P. avium, *Linn.* Europa.
P. Cerasus, *Linn.* Europa.
P. Kerii, *Steud.* (*Cerasus Japonicus*, Ker). Japonia.
P. Japonica, *Thunb.* (*P. Chinensis*, Blum.; *Amygdalus pumila*, Linn.) China, Japonia.
P. instititia, *Linn.* Anglia, Germania, Gall. austr.
P. triloba, *Lindl.* (*Amygdalopsis Lindleyi*, Carr.). China.

Myrtaceæ.

Myrtus communis, *Linn.* Europ. austr.
Punica Granatum, *Linn.* Europ. austr., Mauritania.

Philadelpheæ.

Philadelphus coronarius, *Linn.* Europ. austr.
Deutzia crenata, *Sieb. et Zucc.* Japonia.

Onagrarieæ.

Fuchsia globosa, *Lindl.* (*hybrida*). Mexico.

Clarkia pulchella, *Pursh*. California.
C. elegans, *Dougl*. Amer. sept.

Portulaceæ.

Portulaca grandiflora, *Hook*. Chili.

Grossularieæ.

Ribes sanguineum, *Pursh*. Amer. sept.

Saxifragaceæ.

Saxifraga granulata, *Linn*. Europa.

Umbelliferæ.

Daucus Carota, *Linn*. Europ. (Dr. Masters!)

Rubiaceæ.

Ixora grandiflora, *De Cand*. Ind. orient.
Serissa fœtida, *Comm*. China, Japonia.
Gardenia Fortuniana, *Hook*. China.
G. florida, *Linn*. China, Ind. orient.
G. radicans, *Thunb*. Japonia.

Caprifoliaceæ.

Lonicera Periclymenum, *Linn*. Europ. med.
Sambucus nigra, *Linn*. Europ.

Campanulaceæ.

Campanula latifolia, *Linn*. Europa, Asia.
C. Tenorii, *Morett*. Neapolis.
C. Trachelium, *Linn*. Europa.
C. Vidalii, *H. C. Wats*. Europa.
C. pyramidalis, *Linn*. Europ. austr.
C. rotundifolia, *Linn*. Europa, Amer. sept.
C. persicifolia, *Linn*. Europa.
C. glomerata, *Linn*. Europa, Asia.
C. medium, *Linn*. Europ. austr.
C. rhomboidea, *Linn*. Europ.
Platycodon grandiflorum, *De Cand*. Sibiria, Dahuria.

Ericaceæ.

Calluna vulgaris, *Linn.* Europa, Amer. bor.
Rhododendron Indicum, *Sweet* (*Azalea Indica*, Linn.). Ind. orient.
R. ponticum, *Linn.* Asia min., Iberia.
Azalea nudiflora, *Linn.* Amer. sept.
A. glauca, *Lam.* Amer. sept.
Arbutus Unedo, *Linn.* Europ. austr., Sibiria.
Erica Tetralix, *Linn.* Europ.
E. cinerea, *Linn.* Europ.

Primulaceæ.

Primula villosa, *Jacq.* Europ. med.
P. Auricula, *Linn.* Europa.
P. denticulata, *Smith.* Ind. orient.
P. acaulis, *Jacq.* Europa.
P. elatior, *Jacq.* Europa.
P. prænitens, *Ker* (*P. Sinensis*, Lindl.). China.

Jasmineæ.

Jasminum officinale, *Linn.* Europ. austr. (China ?)
J. Sambac, *Ait.* Ind. orient.
J. hirsutum, *Hook.* China.

Oleaceæ.

Syringa persica, *Linn.* Oriens.
S. vulgaris, *Linn.* Europ. Persia.

Apocyneæ.

Vinca minor, *Linn.* Europa.
V. major, *Linn.* Europa.
Nerium odorum, *Ait.* Ind. orient.
N. Oleander, *Linn.* Europ. austr., Asia med.
Tabernæmontana coronaria, *Willd.* Ind. orient.

Convolvulaceæ.

Calystegia sepium, *R. Brown.* Europa, America, Asia.
C. pubescens, *Lindl.* China.
Convolvulus tricolor, *Linn.* Europ. austr.
Ipomœa pandurata, *Meyer.* Am. austr.

Solaneæ.

Datura cornigera, *Hook.* Peruvia.
D. fastuosa, *Linn.* Amer. austr., Ægyptus.
D. arborea, *Linn.* Amer. austr.
D. chlorantha, *Hook.* Patria?
D. humilis, *Desf.* Patria?
Petunia nyctaginiflora, *Juss.* Laplata.
P. violacea, *Hook.* Bonaria.
Solanum Dulcamara, *Linn.* Europ.

Gentianeæ.

Gentiana Amarella, *Linn.* Europ.

Orobancheæ.

Orobanche, sp. (Dr. Masters!)

Scrophularineæ.

Mimulus luteus, *Linn.* Chile.
Antirrhinum majus, *Linn.* Europ. med. et austr.
Digitalis purpurea, *Linn.* Europa.
Linaria vulgaris, *Mill.* Europ., Amer. bor.
Veronica, sp. (Dr. Masters!)
Calceolaria, sp. (Dr. Masters!)

Gesneraceæ.

Achimenes longiflora, *De Cand.* Mexico.
Gloxinia, sp. (Dr. Masters!)

Verbenaceæ.

Clerodendron fragrans, *Willd.* Japonia.

Nyctagineæ.

Mirabilis Jalapa, *Linn.* Amer. trop.

Laurineæ.

Laurus nobilis, *Linn.* Europ. austr.
L. Sassafras, *Linn.* Amer. sept.

Irideæ.

Gladiolus tristis, *Linn.* Pr. Bon. Sp.

Crocus Susianus, *Curt.* Asia min.
C. pusillus, *Ten.* Italia.
C. vernus, *Smith.* Europ. austr.
Iris Sibirica, *Linn.* Europa, Sibiria.

Amaryllideæ.

Galanthus nivalis, *Linn.* Europa.
Leucojum vernum, *Linn.* Europa.
Sternbergia lutea, *Gawl.* Europa, Asia min., Syria.
Hippeastrum equestre, *Herb.* Amer. austr.
Narcissus cernuus, *Salisb.* Gall. merid., Hispania.
N. Telamonius, *Schult.* Europa.
N. lobularis, *Schult.* Anglia.
N. concolor, *Schult.* Lusitania?
N. biflorus, *Curt.* Britannia, Gallia, Helvetia, Italia.
N. Italicus, *Ker.* Italia.
N. incomparabilis, *Curt.* Ital., Gall. austr.
N. Cypri, *Haw.* Cyprus.
N. Pseudo-narcissus, *Linn.* Europa, Tauria.
N. poeticus, *Linn.* Europa.
N. Jonquilla, *Linn.* Europ. austr., Afr. bor., Oriens.
N. Tazetta, *Linn.* Reg. Medit.
N. poculiformis, *Salisb.* (*N. montanus*, Bot. Reg.). Pyren.

Orchideæ.

Orchis Morio, *Linn.* Europ. (Dr. Masters!)

Hydrocharideæ.

Hydrocharis Morsus-ranæ, *Linn.* Europ.

Asphodeleæ.

Asphodelus luteus, *Linn.* Europ. austr.

Liliaceæ.

Tulipa Gesneriana, *Linn.* Asia min., Thracia.
T. sylvestris, *Linn.* Europ. merid.
Scilla autumnalis, *Linn.* Europa.
S. nutans, *Smith.* Anglia, Europ. austr.
Convallaria majalis, *Linn.* Europa, Sibiria, America.

C. Polygonatum, *Linn.* Europ., Sibiria.
Fritillaria Meleagris, *Linn.* Europa.
F. imperialis, *Linn.* Persia, Europ.
Lilium Martagon, *Linn.* Europa.
L. candidum, *Linn.* Syria, Persia.
Hyacinthus orientalis, *Linn.* Oriens, Gall. austr.
Polianthes tuberosa, *Linn.* Ind. orient. et occ.
Hemerocallis disticha, *Don.* Nepalia, Japonia.
H. fulva, *Linn.* Europ. austr.

Colchicaceæ.

Colchicum autumnale, *Linn.* Europa.

Butomeæ.

Sagittaria latifolia, *Willd.* Amer. sept.
S. sagittifolia, *Linn.* Europ., Asia, Amer.

Commelyneæ.

Tradescantia Virginica, *Linn.* Amer. bor.
Commelyna alba, *Hort.* (Dr. Masters !)

Melanthaceæ.

Tofieldia calyculata, *Wahl.* Europa.

CORRESPONDENCE.

Laws of Nomenclature.

With other members of the British Association, I have received a reprint of the rules of Nomenclature drawn up by Mr. Strickland and others, and printed in the report of the twelfth meeting of the Association (1842), accompanied with a request to examine them carefully, and to communicate any suggestions to Sir Wm. Jardine, Bart.

I can only repeat the suggestion I made when the rules were under the consideration of the Committee of the Natural History Section at Manchester, viz. that the rules be not adopted until they have been compared with Linnæus's 'Philosophia Botanica,' Fabricius's 'Philosophia Entomologica,' Illeger's 'Prodromus,' and De Candolle's 'Théorie Élémentaire;' and that when they are not in conformity with the laws proposed by these authors, which have been accepted by all recognized systematic naturalists, the reasons for the proposed alterations should be given in detail. After some discussion, my suggestion was adopted, and the report was remitted to the Committee to carry it out.

The rules were inserted in the printed report, through the personal influence of Mr. Strickland, who was then a member of the Council, but they never received the sanction of the British Association.

In the American 'Journal of Science and Art,' for March, 1864, there are some admirable observations on some of these rules, which entirely accord with my own views, and which I recommend to the consideration of the Committee.

British Museum. J. E. Gray.

"First, we would recommend that 'the admirable code proposed in the 'Philosophia Botanica' of Linnæus,'—to which, 'if zoologists had paid more attention . . . the present attempt at reform would perhaps have been unnecessary,'—be reprinted, with indications of the rules which in the lapse of time have become inoperative, or were from the first over-nice: *e.g.* 222, 224, 225, 227, 228, 229, 230, etc., most of which are recommendations rather than laws. The British Association's Committee has properly divided its code into two parts:—1. Rules for rectifying the present nomenclature; 2. Recommendations for improving the nomenclature in future. The laws all resolve themselves into, or are consequences of the fundamental law of priority, 'the only effectual and just one.'

"'§ 10. *A name should be changed which has before been proposed for some other genus in zoology or botany, or for some other species in the same genus, when still retained for such genus or species.*' The first part of this rule is intended, we presume, to be the equivalent of No. 230 of the 'Philosophia Botanica: 'Nomina generica plantarum, cum zoologorum et Lithologorum nomenclaturis communia, si a Botanicis postea assumta, ad ipsos remittenda sunt.' We submit that this rule, however proper in its day, is now inapplicable. Endlicher, who in a few cases endeavoured to apply it, will probably be the last general writer to change generic names in botany because they are established in zoology. It is quite enough if botanists, and perhaps more than can practically be effected if zoologists, will see that the same generic name is used but once in each respective kingdom of nature.

"'§ 12. *A name which has never been clearly defined in some published work should be changed for the earliest name by which the object shall have been so defined.*' Very well. And the good of science demands that unpublished descriptions, and manuscript names in collections, however public, should assert no claim as against properly published names. But suppose the author of the latter well knew of the earlier manuscript or unpublished name, and had met with it in public collections, such name being unobjectionable, may he wilfully disregard it? And as to names without characters, may not the affixing of a name to a sufficient specimen in distributed collections (a common way in botany) more surely identify the genus or species than might a brief published description? Now the remarks of the Committee, prefixed to § 12, while they state the legal rule of priority, do not state, nor in any way intimate, that a wilful disregard of unpublished names, especially of those in public or distributed collections, is injurious, dishonourable, and morally wrong. In the brotherhood of botanists, it should be added, custom and courtesy and scientific convenience in this respect have the practical force of law, the wilful viola-

tion of which would not long be tolerated; and the distribution of named specimens, where and as far as they go, is held to be tantamount to publication.

"As to the recommendations for the future improvement of nomenclature, in passing under review the 'Classes of objectionable names,' we wonder that geographical specific names should have been objected to: we find them very convenient in botany and, next to characteristic names, about as good as any. Comparative specific names in *oides* and *inea*, etc., are much used by botanists, and are often particularly characteristic. Specific names derived from persons, used with discretion, and as far as possible restricted to those who have had to do with the species, as discoverer, describer, etc., are surely unobjectionable. Generic names derived from persons are, we agree, best restricted to botany, where, when appropriately applied, they are in good taste, if not too cacophonous. As to closely resembling names, in large genera it may sometimes be best to 'call a species *virens* or *virescens*' when there is already a *viridis*. Anagrams, like puns, if not cautiously handled and particularly well made, are intolerable. But what can be prettier, among unmeaning names, than R. Brown's *Tellima*? Botanists will hardly agree that a good generic name which has been effectually superseded by the law of priority, should never afterwards be bestowed upon some other genus of some other order. 'It has sometimes been the practice, in subdividing an old genus, to give to the lesser genera so formed the names of their respective typical species.' The Committee objects to this usage because the promotion calls for new specific names. To us it seems a natural and proper course, when the name of the species in question is substantive and otherwise fitting,—most proper when (to take a not uncommon case) one used generically in the first place by ante-Linnæan naturalists or herbalists.

"But the objection of the Committee is probably connected with a peculiar view which they have adopted as to the way of citing species which have been transferred to some other than the original genus. Here many zoologists, and a few botanists, have been giving themselves much trouble and perplexity, as it seems to us, to little purpose. Take for illustration our Blue Cohosh, originally *Leontice thalictroides* of Linnæus, but afterwards, in Michaux's Flora, taken as the type of a new genus, and therefore appearing as *Caulophyllum thalictroides*. Now if we adopt the view of Linnæus, to which he would probably have adhered had he lived till now, we write the name and the authority thus:—

"***Leontice thalictroides***, Linn.

"(Syn. *Caulophyllum thalictroides*, Michx.)

The abbreviated names of the authors appended stand in place of the full reference, *e.g.* Linn. Sp. Pl. i. p. 448, and Michx. Fl. Bor.-Am. i. p. 205, t. 21. If the other view be adopted, it stands, in fact:—

"*Caulophyllum thalictroides*, Michx.

"(Syn. ***Leontice thalictroides***, Linn.)

But, fearful lest the original describer should be robbed of his due credit, it has been proposed to write,—

"*Caulophyllum thalictroides*, Linn. This is not only an anachronism of

half a century, but an imposition upon Linnæus of a view which he had not and perhaps would not have adopted. To avoid such fatal objections, it has been proposed to write *Caulophyllum* (Michx.) *thalictroides*, Linn.; which is not only 'too lengthy and inconvenient to be used with ease and rapidity,' but too cumbrous and uncouth to be used at all. And finally, the Committee propose to write,—

"*Caulophyllum thalictroides* (Linn.) (sp.),—

which is scarcely shorter, or even to leave out the (sp.). The reader is thus to note that Linnæus originally gave the specific name *thalictroides*, but not the generic. Who did, must be otherwise ascertained. A pretty long experience convinces us that much confusion is risked or trouble expended, and nothing worth secured by these endeavours to put forward the original rather than the actual application of a specific name. Ante-Linnæan nomenclature broke down in the attempt to combine specific appellation with description. Here the attempt is to connect it with the history of its origin, which, after all, can be rightly told only in the synonymy. The natural remedy for the supposed evil which this mode of citation was to cure is, to consider (as is simply the fact) that the appended authority does not indicate the origin, but only the application at the time being, of the particular name, and so no one is thus robbed of his due. The instructed naturalist very well knows the bibliography of species, or where to look for it; the tyro can learn.

"'§ *C. Specific names should always be written with a small initial letter, even when derived from persons or places*:'—on the ground that proper names written with a capital letter are liable to be mistaken for generic. (But no naturalist would be apt to write the name of a species without that of the genus, or its initial, preceding.) Also, 'that all species are *equal*, and should therefore be written all *alike*.' The question is one of convenience, taste, and usage. As to the first, we do not think a strong case is made out. If mere uniformity be the leading consideration, it might be well to follow the example of the American author who corrected *Ranunculus Flammula*, Linn., and *R. Cymbalaria*, Pursh, into *R. flammulus* and *R. cymbalarius!* As to taste and usage, we suppose there would be a vast preponderance against the innovation, so far as respects personal names and those substantive names which Linnæus delighted to gather from the old herbalists, etc., and turn to specific use, e. g. *Ranunculus Flammula*, *R. Lingua*, *R. Thora*, *R. Ficaria*, and the like. Adjective names of places and countries, Linnæus printed with a small initial, e. g. *R. lapponicus*, etc. De Candolle writes such names with a capital letter; and this best accords with English analogy, but has not been universally adopted, and probably will not be.

"'§ *F. It is recommended that in subdividing an old genus in future, the names given to the subdivisions should agree in gender with that of the original group.*' The practical objection to this is, that old names should be revived for these genera or subgenera, if there be any applicable ones, which is likely to be the case in botany." A. G.

BOTANICAL NEWS.

At a meeting of the Council of the Royal Horticultural Society, held 15th April, 1864, memorials and letters from various botanists were read, remonstrating against the possible effects of the prizes as leading to the extirpation of rare plants. The object of the Society in offering these prizes had been simply to encourage and extend the study of British botany throughout the country. Without sharing the apprehensions entertained by the memorialists—the Council, in deference to the remonstrance of those whose opinion is entitled to so much weight, have determined to intimate to the competitors :—(1.) That the number of plants in the collections need not be numerous, and should not exceed in any case 200. (2.) That the presence of rare plants in the collections is not desired, and will not in any way enhance the competitor's prospects of success ; and (3.) That each plant should be prepared, showing various *stages* of development, from its embryo to its fruiting, displaying at each stage its structure. In this form the prizes may be of use, and we are glad to find the objections felt to them in their original form, are now removed. It may be hoped that local societies will take a hint from the Horticultural Society, and give up the prizes that they are offering for collections in which the *number and rarity* of the specimens are taken into account.

On the 13th of May, Dr. Seemann returned from Venezuela, where he has been exploring the river Tocuyo, and discovered extensive coal-beds, the coal resembling the Welsh steam coal in appearance, and valued in London at 30*s.* per ton. He left England on the 2nd of February, and touching at St. Thomas, reached La Guaira on the 20th of the same month. Thence he proceeded to Caracas, Porto Cabello, Chichirivichi, and the river Tocuyo, visiting on his homeward route Curaçao and St. Thomas.

Mr. Spruce, the greatest of recent South American travellers, writes to us from Peru that he has at last made up his mind to return to Europe by the mail which leaves Payta on the 1st May, and in our next issue we may have the pleasure of announcing that this enterprising explorer is actually among us.

We regret to have to announce the death of Mr. Crüger, Superintendent of the Botanic Gardens, Trinidad, which took place on the 25th of February. Mr. Crüger succeeded Mr. Purdie, the botanical collector in New Granada, and is principally known by his physiological and morphological papers communicated to the Bot. Zeitung. Mr. Presto has been appointed to the vacancy.

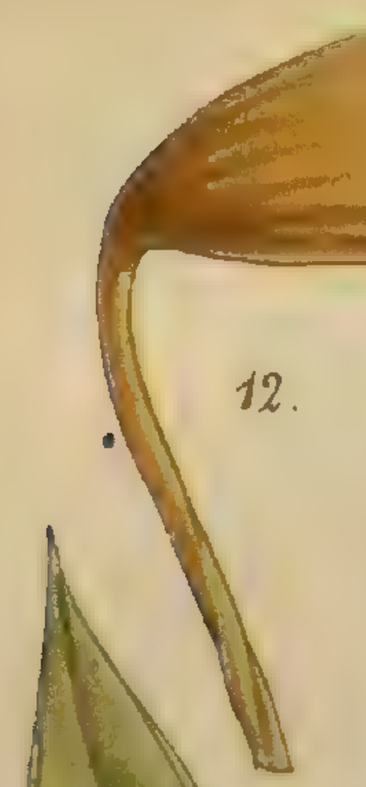
A sad calamity has befallen Mr. J. G. Baker, of Thirsk. During the night of the 14th of May, a fire broke out on his premises, when property, to the amount of £10,000, scarcely a tenth part of which had been insured, was destroyed, including his library and herbarium, perhaps one of the richest in British plants there was in the country. The remaining stock of his recently published work on 'North Yorkshire' shared the same fate. Mr. Baker was just in the midst of a book on Northumberland and Durham, on the plan of that on North Yorkshire.

Failing eyesight, probably caused by working too much by gaslight, has induced Mr. John Smith, Curator of the Botanic Gardens at Kew, to ask to be

allowed to retire. A few days ago the Government granted his request, and at the same time awarded him the highest superannuation allowance the rules of the Civil Service allowed. This is handsome, and as it should be. There has not been a more faithful and conscientious public servant than Mr. Smith, who filled the office of Curator of the Botanic Garden for nearly half a century, and whose love for plants and enthusiasm for botany are equalled only by the readiness with which he is wont to impart the information which his long practical experience has enabled him to accumulate. Mr. Smith gave up his charge on the 16th of May, and, at the time of the transfer, the garden was in the best possible order. His successor is, strangely enough, a namesake, Mr. John Smith, of Syon House. The late Curator will now have plenty of time to devote to the completion of his pteridological publications. At this stage of Mr. Smith's career, it may not be out of place to remind our readers that he has originated several important questions which still agitate the scientific world, for instance, that of parthenogenesis in plants, and the systematic value of venation and vernation in Ferns, all of which will be found in the following publications:—

Observations on the Cause of Ergot: read before Linn. Soc. in 1838, and published in their Transactions.—Notice of a Plant which produces perfect seeds without any apparent action of pollen, with figure of plant and analysis: read before Linn. Soc. in 1839, and published in Transactions. (This was the first and original notice of *Cœlebogyne*, and the plant was here named.)—An arrangement of the Genera of Ferns: read before the Linn. Soc., and published in several vols. of Hooker's 'Journal of Botany.'—Enumeratio Filicum Philippinarum, or a Systematic Arrangement of the Ferns collected by Cuming. Published in Hook. Journ. Bot. 1841.—Remarks on *Sphærostephanos*, among Ferns. Hook. Journ. Bot. 1841.—Description and Figure of a New Genus of Ferns, called *Hewardia*. Hook. Journ. Bot. 1841.—Characters of several new Genera of Ferns in Hooker and Bauer's 'Genera Filicum.'—Observations on *Syngramme*, a new genus of Ferns. Hook. Journ. 1845.—Enumeration of Schomburgk's Ferns of Guiana. Hook. Journ. 1842.—Enumeration of the Ferns growing in the Royal Botanic Garden, Kew, in 1846, with observations and descriptions of new genera and species: published in the Appendix to the Bot. Mag. for 1846.—Enumeration of the Ferns of Panama, Western Mexico, and Hongkong, with observations and descriptions of new species: in Seemann's Bot. of the Herald. (Here the scheme of arrangement by vernation was first promulgated.)—Observations on *Stangeria*, a remarkable Cycadaceous plant, from Natal. Hook. Journ. Bot. 1854.—Cultivated Ferns, or a Catalogue of the Indigenous and Exotic Ferns cultivated in British gardens, with characters of the genera, principal synonyms, etc. Pamplin, 1857.—(New edition in preparation.)

We rejoice to receive the concluding part of Hooker's 'Species Filicum' and the first section of the fifteenth volume of De Candolle's 'Prodromus,' containing the *Laurineæ*, *Begoniaceæ*, *Datiscaceæ*, *Papayaceæ*, *Aristolochiaceæ*, and *Stackhousiaceæ*.



12.

9.

10

11.

13.

Funaria microstoma.

1.

6.

2.

5.

4.

3

Seligeria calcicola.

20.

14.

16.

18.

19.

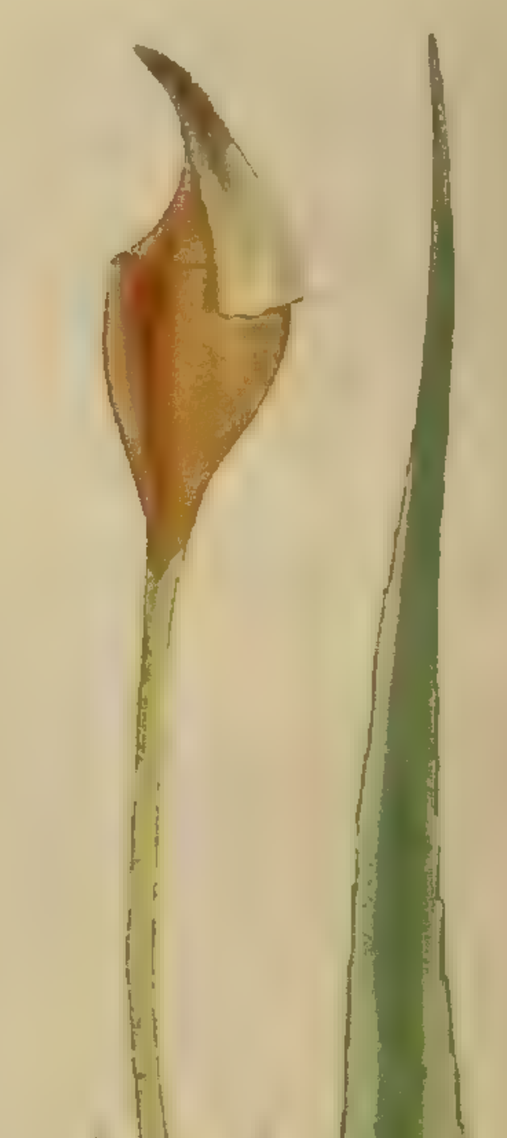
17.

15.

Hypnum imponens.

7.

Seligeria calcarea.



8

Seligeria pusilla.

W. Fitch, del. et lith.

Vincent Brooks, Imp.

DESCRIPTIONS OF NEW BRITISH MOSSES.

By W. Mitten, Esq., A.L.S.

(Plate XIX.)

Hypnum imponens, Hedw. Stems red, prostrate, or when closely tufted ascending, irregularly pinnate with branches of uneven length. Leaves yellowish-green, in age becoming brown, all secund, hooked, ovate-lanceolate, gradually narrowed to the slender point, slightly concave with two short nerves, the margin for a short space near the base, recurved, and from above the middle to the point minutely serrulate, the cells elongated and very narrow, the alar cells small, square, well defined, the outer ones pellucid, those next towards the nerve deep-brown; leaves of the branches narrower, with their lower margins somewhat plane. Phyllidia small, variously divided, brown. Perichætium composed of numerous leaves, attenuated, flexuose, and serrulate from an ovate 2-nerved base. Capsule on a seta an inch or more long, cylindrical, erect or slightly curved, operculum conical, peristome as in *H. cupressiforme*, inflorescence dioicous.

H. imponens, Hedwig, Sp. Musc. p. 290, t. 77; Brid. ii. p. 618; Schw. suppl. i. p. 291; Müller, Synops. ii. p. 291; Sullivant, p. 74, Schimper, Synops. p. 624.

Creeping on the bare soil, and growing into matted tufts on Reigate Heath, Surrey. June, 1864. The female plant only.

In general appearance, this Moss is intermediate between *H. molluscum* and *H. cupressiforme*, but it is more smooth and browner than the first, and its leaves are more circinate and more yellowish-green than those of the last, to which it is more closely allied, but differs in its leaves being more serrulate, the alar cells pellucid and arranged in a different manner, the presence of small phyllidia, and the capsule and operculum are also different in form.

Originally described by Hedwig from specimens collected by Muhlenberg in the United States, where the species would appear to be very abundant from the specimens collected by Torrey, Cooley, Drummond, and Sullivant; it has more recently been observed in a few places in Europe, and M. Schimper states that it has been twice gathered in fruit, which is produced in October in the Vosges, and in

his specimens is smaller and less erect and even-sided than in American specimens.

Funaria microstoma, B. and S., closely resembling *F. hygrometrica*, but smaller, comal leaves, oval-elliptic acuminate, their points connivent. Seta short, when wet bent over with a wide curve, when dry nearly straight; capsule bent downwards, obovate pyriform, when mature yellow, afterwards deep-brown, and when dry plicate; operculum slightly raised in the middle; outer peristome with teeth, red below, paler and trabeculate above, at their apices connected together into a small cellular expansion; inner peristome very short and adherent to the bases of the teeth; annulus very wide and compound; calyptra with a long beak.—*F. microstoma*, Bryol. Europ. Funaria, p. 9, t. 4; Schimper Synopsis, p. 324; C. Müller, Synops. i. p. 106.

In a small spot destitute of herbage by the roadside at Maresfield, Sussex, with ripe fruit, May, 1864.

This species very nearly resembles small states of *F. hygrometrica*, and may be easily passed over as a state of that ubiquitous Moss, but it may be readily distinguished by its capsule having a smaller mouth and the imperfect internal peristome; there is also a difference in the aspect of the mature capsule, which having its mouth a little more curved under opens in a more downward direction.

F. microstoma was first published in the 'Bryologia Europæa,' and in M. Schimper's 'Synopsis' he gives four localities, the nearest of which to Britain is Normandy, besides which, it occurs in North-west India, and is probably overlooked elsewhere from its great similarity to *F. hygrometrica*.

The figure in the Bryol. Europ. represents the mouth of the capsule much too small.

Seligeria calcicola, mentioned in Berkeley's 'Handbook of British Mosses,' is a very inconspicuous species, found on chalk stones partially imbedded in the earth in banks and under the shade of bushes on the north side of the South Downs; it occurs also on the Surrey Downs at Box Hill. It does not appear to prefer the same localities as *S. calcarea*, for the two species have not been observed growing together, although they both inhabit the same range of Downs.

From *S. calcarea*, Dicks, *S. calcicola* differs in its leaves being gradually attenuated to the apex, and its capsule having an obovate form both before and after the fall of the operculum. In *S. calcarea*

the leaves are scarcely narrowed above the middle, and end in a blunt point, the upper portion of the leaf appearing, on transverse section, to be composed entirely of the dilated plano-convex nerve; in *S. calcicola* the nerve is narrower, and distinguishable from the pagina nearly to the apex; occasionally a leaf may be found in which the nerve appears altogether wanting. In *S. calcarea* the capsule, after the fall of the operculum, becomes remarkably turbinate from the dilation of its mouth. The operculum, calyptra, and peristome are alike in both species From these *S. pusilla*, Ehrh., differs in the bright green colour of its much narrower leaves. Until the publication of that portion of the 'Bryologia Europæa' containing the *Seligeriæ*, *S. calcicola* was supposed to be the *Grimmia Seligeri* of Weber and Mohr, p. 140, and these authors, who seem to have been very well acquainted with *S. calcarea* and *S. pusilla*, finish their remarks upon *G. Seligeri* by saying at p. 459, "Intermedia quasi species inter *G. pusilla* et *calcar.*," having in their description pointed out that the leaves were different in *G. Seligeri* from both those species. In Nees, Hornschuch, and Sturm, 'Bryologia Germanica,' vol. ii. p. 105, *Weissia Seligeri* is characterized thus, "subacaulis, sordide viridis, foliis strictis infimis ovatis enervibus reliquis lanceolatis apice subalatis, capsula obovata, operculo e basi convexa subulato subobliquo," t. 34, f. 26, and excepting that the figure of the entire plant has the leaves represented too short, both it and the description correspond well with the Sussex species. In the 'Bryologia Europæa' the *Weissia Seligeri*, Bry. Germ. is referred to *Seligeria pusilla* with the following remark:—"Nous avons pu nous convaincre sur des échantillons originaux que le *Weissia Seligeri* des auteurs ne diffère de la forme type du *S. pusilla* que par les feuilles un peu moins longues et d'un vert moins gai;" and at the end of their history of the species of the genus *Seligeria* they also say, "Quand les auteurs du *Bryologia Germanica* séparent leur *Weisia Seligeri* du *W. pusilla*, c'est que ces savants bryologistes n'ont pas tenu compte de la station et de l'âge des individus qu'ils avaient sous les yeux en formant cette espèce." Unless, therefore, this conclusion has been too hastily arrived at, the *Weissia Seligeri* of authors must be given up as only a form of *S. pusilla*, notwithstanding the close agreement of its characteristics with those assignable to *S. calcicola*.

Explanation of Plate XIX.

Fig. 1. *S. calcicola* (natural size). Fig. 2. Entire plant, with male flowers at

its base,—*magnified*. Fig. 3. Lower leaf. Fig. 4. Intermediate; and Fig. 5. Perichætial leaves. Fig. 6. Portion of peristome. Fig. 7. *S. calcarea*, entire plant, with male flower at its base, and intermediate leaf,—*magnified*. Fig. 8. *S. pusilla*, entire plant and its male flower, with an intermediate leaf,—*magnified*.

Funaria microstoma.—Fig. 9. Stem,—*natural size*. Fig. 10, 11. Leaves. Fig. 12. Capsule and operculum. Fig. 13. Portion of peristome,—*magnified*.

Hypnum imponens.—Fig. 14. Plant,—*natural size*. Fig. 15. A leaf spread out from the back of the stem. Fig. 16. One from the side. Fig. 17. A branch-leaf. Fig. 18. Phyllidia. Fig. 19. Perichætium. Fig. 20. Capsule and operculum from an American specimen:—*all magnified*.

SOME REMARKS ON THE FLOWERS OF *EUPHORBIA AMYGDALOIDES*.

By W. G. Smith, Esq.

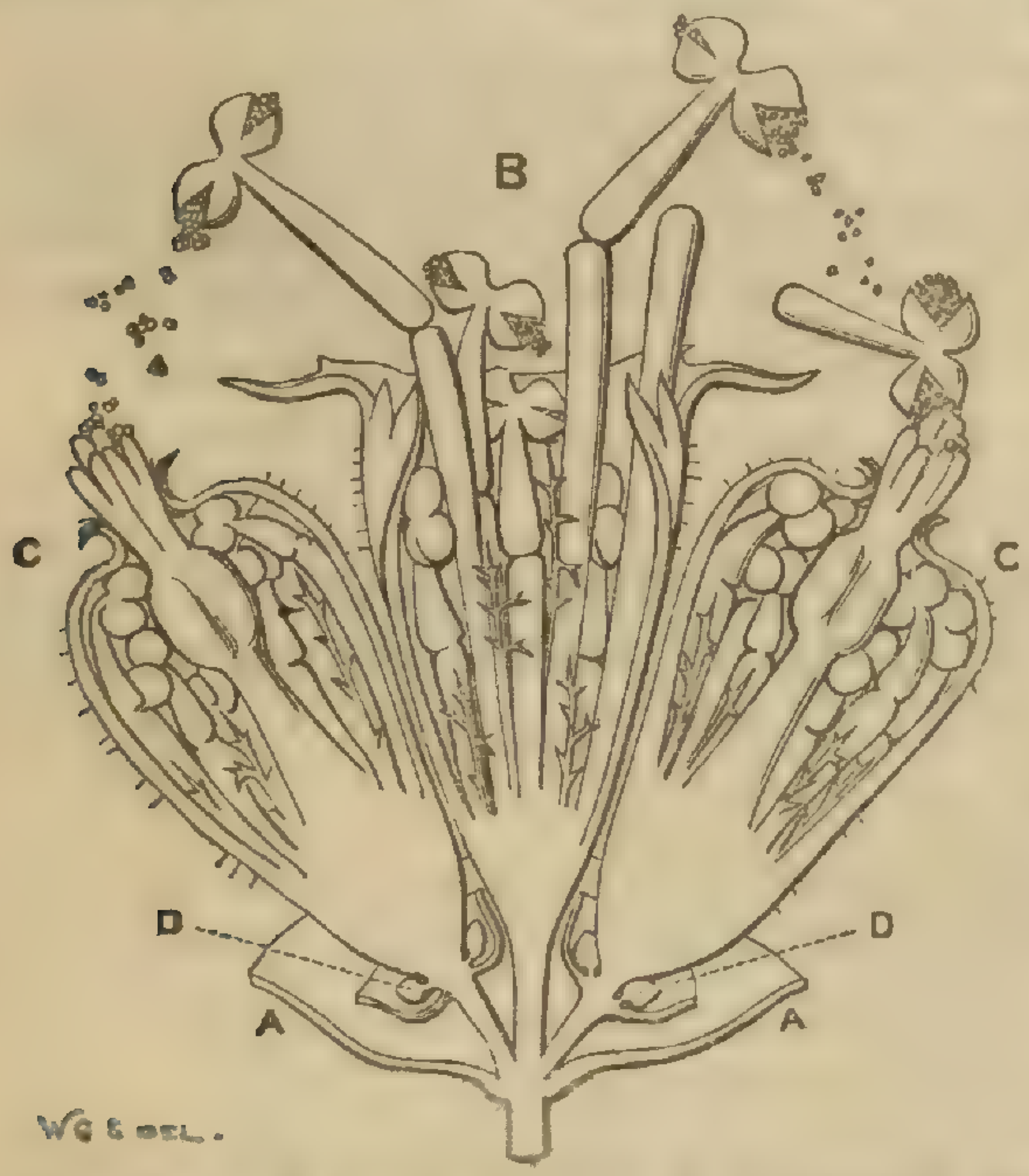
To any one imperfectly acquainted with the genus *Euphorbia*, the statement that each plant of *E. amygdaloides* bears on an average more than 7000 flowers might be sufficiently surprising, but the fact can be shown very simply. The plant I have before me, in its early state contains 31 flower-heads; but as each of these embrace 30 secondary ones, this gives 713, still not flowers but flower-heads. If the involucral leaves of each secondary flower-head be removed an involucre will be displayed, containing 12 or 13 distinct flowers; if the former number, 713, be now multiplied by the lower of these two figures, viz. 12, it gives 8556 flowers. The remarks I propose making refer to these separate, individual flowers, male and female, and their arrangement in the involucres, in which my observations, if correct, render the descriptions of the genus *Euphorbia*, as applied to this species in all our local Floras and general systematic works incorrect. The observations I have myself made on a large number of plants, slightly disagree with these descriptions, but it will be seen that this slight difference proves to be of importance. The descriptions perfectly agree with the plant in its more advanced stage, when the peduncles begin to be branched, and when the flowers are considered perfect,—this is how the plant is always drawn, and how it is gathered for the herbarium; but in this state it is imperfect, and has lost a single flower-head from each peduncle, so that whilst in the first stage it really has 8556 flowers, it has in the second only 8484, or

372 flowers less, or I had better say it has lost one flower-head from each original peduncle, making 23 flower-heads less, containing, as before stated, 372 flowers. If these missing flower-heads were similar to the flower-heads remaining on the plant, the descriptions alluded to would be correct, but from an examination of a large number of specimens I am prepared to say positively they are not the same; for whilst all the other flower-heads on the plant consist of single females surrounded by males, these 23 original and first opened involucres consist of male flowers only, without having in any single instance a female in the centre. As soon as the pollen is shed out of the anthers of these particular flowers their function is ended, and as there is no ovary they soon wither away. By the time the ordinary male and female flowers appear, they have entirely disappeared, leaving not a trace behind.

Did these deciduous flower-heads play no part in the economy of the plant they might be considered of little importance, but I am inclined to believe they are of extreme value. In the first place, not only do they permanently differ in the shapes of the horns, etc. of the involucre, but all my observations tend to prove that these transitory, fleeting, and short-lived group of flowers are the only ones that bear fruitful pollen, and that all the females that are fertilized are fertilized by them.

An ordinary flower-head of males and females, with the involucral leaves removed, presents always (in the early state) and when the original flower-head of males is open, the truly extraordinary appearance of a flower in bud, with the pistils protruded through the top, the involucre tightly binding it round the base of the pistils, so that the stamens cannot get out. The stamens are bound down and twisted in the bud, as shown in section of the same flower-head, and as if to make it more impossible for any of its own pollen to get to these stigmas, the small opening at top, where the pistils emerge, is packed with extremely fine, almost invisible hairs. Now, when the anthers of the flower-head of males are ready to shed their pollen they no longer remain inside the involucre, but elongate themselves, so that they stand bodily out, and display a joint in the filament of each; at this particular time the involucral leaves that enclose the head of flowers with the female slightly open, and display the stigmas; the pollen from the original flower then falls and fertilizes the ovules of the female, or the slightest

touch makes the filament break in two at the joint, when one half falls bodily off, probably on to the stigmas of the female, or if not the pollen is sure to fall on them when the filament breaks at the articulation. It will thus be seen this flower plays no unimportant part.*



When the ordinary involucres open, and after the stigmas have been fertilized the ovary is pendulous, and is generally held down between the 2 teeth that alternate between the 4 glands, for what purpose I do not know. It eventually becomes again erect, and though, in its earlier states, it is termed pendulous, the stem that supports the ovary is always stubborn or inflexible. Soon after this, the male flowers that surround the female, put up their anthers sparingly, which are sometimes ruptured; but from my observations of the pollen, I believe it is abortive, for it is generally in a semi-liquid state, and seldom or never in granules. And, although I have seen the anthers ruptured, I have never seen the pollen shed, but it appears always to stick in a pasty mass about the anthers. As a rule only one or two of the anthers open in these flowers, and as you examine the flowers, male and female, on the forks as they get more and more removed from the original stem, they are more and more abortive.

I am led to think, from what I have stated, that the flower-head, of males only, seen for so short a time, and hitherto overlooked by botanists,

* Description of Figure.—Section through head of primary flowering branch of *Euphorbia amygdaloides*. The primary floral leaves removed at A A.—B. The first flower-head that opens consisting of males alone.—C C. The two hermaphrodite flower-heads (floral leaves removed, which partially open to receive the pollen), involucre still closed, and the protruding stigmas exposed to the action of the pollen from flowers of head, B.—D D. Third series of hermaphrodite flower-heads with the fourth series at their bases, which are all developed during the summer, but seldom produce fruit.

contains the only flowers in each branch that fertilize the females in their neighbourhood, and I believe (although I have not yet tried the experiment) that if all these original flower-heads were cut off the plants would produce no fruit; for in the plants I have seen, the two flowers usually fertilized were the flowers that grew side by side, and in close proximity to this particular head of male flowers. It is true the flower-heads of the secondary peduncles sometimes have the ovary more or less swollen, and occasionally the seeds may be fertilized, but if the seeds are fertilized by the pollen of their own males, it is an *exception to the rule*. It is not at all improbable that the pollen form an original head of male flowers somewhere else on the plant, and in a less advanced state may effect this.

Since writing the above I have examined several other species of *Euphorbia*, and traces of the flower-heads containing males alone, could be distinctly seen.

BOTANICAL EXPLORATIONS OF MR. RICHARD SPRUCE.

We are glad to announce that Mr. Spruce has safely returned to England, after an absence of fifteen years in South America. Previous to his departure from Europe, this enterprising traveller had investigated the botany, especially muscology, of Yorkshire and the Pyrenees. He left Liverpool on the 7th of June, 1849, and reached Pará, Brazil, on the 12th of July. After spending three months in exploring the environs of that city, he ascended the Amazon to Santarem, at the mouth of the Tapajoz, and in November of the same year went seventy miles further up, to Obydos, where the Amazon is at its narrowest and deepest. Starting from Obydos, he explored the Trombetas and its tributary, the Aripecurú, as far as the cataracts of the latter, in lat. 0° 47′ N., fixing five latitudes by astronomical observations, and making a map of those previously unknown rivers. Returning to Santarem in January, 1850, he remained there exploring the lower part of the Tapajoz and adjacent parts of the Amazon until October, when he started up the Amazon for the Barra do Rio Negro, where he arrived after a voyage of sixty-three days, thirty whereof were spent in the channels to the south of the great island of Tupinambaráua. The greater part of the year 1851 was occupied in studying and collecting the rich vegetation of the lower part of the Rio Negro, and of the Amazon for a few days' journey up; and in November he started for the head-waters of the Rio Negro, in a boat of about nine tons burden, which he had fitted up expressly with that object. Early in January, 1852, Mr. Spruce reached the

village of São Gabriel, situated about midway of the *cachoeiras*, or cataracts of the Rio Negro, and after remaining there some seven months, he proceeded up the large river Uaupés, which had been scarcely known to Europeans, even by name, until Mr. Wallace's adventurous exploration of it the preceding year. Mr. Spruce found the Uaupés to possess a more novel and beautiful forest-vegetation than any other part of South America, and his collections include several undescribed genera, besides many species notable for their beauty and the value of their products. Mr. Spruce remained on the Uaupés until March, 1853, when he sailed out of it into the Rio Negro, and up the latter river beyond the Brazilian frontier, to San Carlos del Rio Negro. This village was his head-quarters during his stay in Venezuela, which extended to November, 1854, or more than a year and a half. During that time he made two expeditions to the Orinoco, one by way of the Casiquiari, and the other by the portage of Pimichin and the Atabapo. On the former of these, besides examining the Casiquiari, both ascending and descending, he explored its tributary, the Pacimoni, to its source, among the lofty and picturesque mountains called Iméi and Tibiali; as also the river Cunucunúma, which bathes the western foot of the immense granite mass of Dinda, and enters the Orinoco a little below the bifurcation of the Casiquiari. On his second visit to the Orinoco, he went as far down as to the cataracts of Maypures, rendered famous by the narrative of Humboldt and Bonpland. There and elsewhere in the region of the Upper Orinoco and Rio Negro he gathered many of the plants discovered by those illustrious travellers, and not since seen by any botanist. He also constructed maps of the hitherto unsurveyed rivers, Cunucunúma and Pacimoni. Leaving Venezuela, he descended the Rio Negro, and reached the Barra do Rio Negro about the end of 1854, after an absence of above three years. Having reposed there over two months, he took advantage of the steamers which had been lately established on the Amazon, to ascend that river beyond the Brazilian frontier, to Nauta in Peru, near the mouth of the Ucayali; and thence he went in canoes up the Marañon and its tributary, the Huallaga, to Tarapoto, a large and thriving town in the ancient Province of Maynas. In the lovely valley of Tarapoto, which, like many similar ones in the eastern roots of the Andes, will one day be the site of a magnificent city—when the immense resources of the Amazon valley and its unrivalled fluvial system, shall have been fully developed—he remained nearly two years, and collected there, besides a vast variety of other plants, no fewer than two hundred and fifty species of ferns, in an area of only fifty miles in diameter. In March, 1857, Mr. Spruce left Tarapoto for Ecuador, descending the Huallaga to its confluence with the Marañon, then ascending the latter river and its affluents the Pastasa and Bombonasa to Canelos; finally, through the forest of Canelos on foot to the village of Baños, at the foot of the volcano of Tunguragua. In this disastrous journey, which occupied a hundred days, he had to abandon all his goods in the forest, to escape perishing of hunger at the passage of swollen rivers. Making Baños his head-quarters, he devoted above six months to the exploration of the forests and *paramos* of its huge volcano, and of the upper part of the valley of the Pastasa. In January, 1858, he removed

to Ambato, which for more than two years was his point of departure for excursions to Quito, Riobamba, etc., and to various points in the eastern and western cordilleras of the Quitenian Andes; although his movements were much harassed and restricted by the revolutionary state of the country. In 1860 Mr. Spruce communicated a valuable paper to the Royal Geographical Society, on the mountains of Llanganati, in the eastern cordillera of the Quitenian Andes. (Journal for 1861, pp. 163–184.) He has also communicated numerous important papers to the Linnæan Society. In 1860 he was occupied for some months in procuring seeds and plants of the *Chinchona succirubra*, or Red Bark plant, for cultivation in India—a task which was confided to him by Mr. Clements R. Markham, on behalf of her Majesty's Government. Mr. Spruce displayed great zeal and resolution in performing this arduous service, while suffering from the effects of rheumatic fever, and his labours received the unqualified approbation of the Secretary of State for India. His elaborate Report on the expedition conducted by him to procure these seeds and plants (accompanied by a meteorological journal, and a complete sketch of the vegetation of the Chinchona forests), is by far the best that has appeared on this subject in any language, and has been invaluable as a guide to the cultivation of these precious plants in India. It covers a hundred and twelve printed pages. Afterwards, his broken health seeming to require a return to a warm climate, he removed to the plain of Guayaquil, and his active labours as a botanist may be said to have closed with the picking up of a few plants in that neighbourhood during the year 1861, and during 1862 at Chanduy, on the coast, near Punta Santa Elena, where an exceptional rainy season, coming after an interval of fifteen rainless years, enabled him to make a small but interesting collection of the ephemeral plants which, under the influence of the rains, sprang up on the desert, and also of several curious trees and shrubs, whose blackened stems had not for some years past put forth even a leaf.

The results of this long course of travel (the objects of which were at first purely botanical) comprise from six thousand to seven thousand species of flowering plants and ferns, whereof a very large proportion were entirely new to science, especially among the trees, the timber and other products of which were also ascertained to be in many cases of great value. Several new species may be instanced, and one entirely new genus, of trees producing the best kind of *caoutchouc*, which is now extracted from them in large quantities, but was not until Mr. Spruce pointed the trees out on the Rio Negro and elsewhere. His specimens of all these plants are preserved in the principal public and private collections, and are therefore perfectly accessible for the purposes of science. A very large collection of cryptogamic plants—perhaps the largest ever made by any single collector—still remains to be worked up. Mr. Spruce's manuscripts contain, besides notes on all the plants collected, vocabularies of twenty-one native languages of the Amazon valley, meteorological observations, barometric levellings, etc., throughout the regions visited, maps of three rivers which had not previously been surveyed, notes of travel, of the aspects and capabilities of the various countries, of the customs, food, trade, and agriculture of their inhabitants, etc.

ON *ALSINE PALLIDA*, *Dum.*

By Charles C. Babington, M.A., F.R.S.

In the 'Bulletin de la Société R. de Botanique de Belgique' (ii. 43) M. Piré has attempted to show that the *Alsine pallida*, Dum., ought, together with its allies, to be separated from the genus *Stellaria*, and called *Alsine*. In this he is following the example of Du Mortier, who thus arranged them in the year 1827 (Prod. Fl. Belg. 109). He also directs our attention to the fact that this is the group upon which Linnæus intended to confer the name of *Alsine*. M. Piré likewise endeavours to prove that the *A. pallida* is specifically distinct from the *A. media* (*Stell. media*, Vill.). He says that it "is known at a glance by its small size, yellowish-green colour, and prostrate stems. It is distinguished from *A. media*, Linn., by its want of petals, its two or very rarely three stamens, the form and colour of its seeds, and its very characteristic stigmas, which are arcuate and recurved over the ovary. Also the peduncles of the fruit are always straight. The flower never expands, but fertilization takes place within the closed calyx, which at that time is nearly sessile. As soon as the fertilization is perfected, the peduncle begins to lengthen, and the capsule to increase rapidly in size, but the sepals continue closely adpressed. The capsule ultimately falls, still enveloped in the calyx by an articulation at the top of the peduncle." It should be stated that this is an abstract, not translation of M. Piré's observations.

On this it may be remarked that *S. media* is not unfrequently found with prostrate stems: it usually, but certainly not always, has petals; occasionally petaliferous plants of it have only two or three stamens, and its styles are sometimes undistinguishable from those of *A. pallida*, Dum. Also the seeds do not seem to have that constant difference in shape and colour which is attributed to them by M. Piré.

The fruitstalks of *A. pallida* curve strongly downwards after fertilization has taken place, but become quite straight and upright when the seeds are nearly ripe. Those of *S. media* pass through similar changes.

Piré believes that the calyx is always closed; Boreau that it rarely opens. In bright sunshine it certainly does slightly expand, so as to render the ovary and stamens clearly visible. In dull weather the

fertilization is perfected in the closed calyx. The deciduous character of the persistent fruit-calyx is found in all the allied plants, but does not invariably take place; indeed, Du Mortier gives "fructus cum calyce articulato-deciduus" as a character of his genus *Alsine*, in which he places (1) *A. pallida*, Dum., (2) *A. media*, Linn., (3) *A. neglecta*, Lej.,=*S. neglecta*, Weihe, (4) *A. latifolia*, Dum.,=*S. latifolia*, Pers., (5) *A. nemorum*, Dum.,=*S. nemorum*, Linn. *Stellaria latifolia* and *S. nemorum* are now believed to form one species, and I fully concur with those botanists who combine the remaining three (1, 2, and 3) to form the species *Stellaria media*, Vill.

Du Mortier gives the following character for his *A. pallida*:—A. "caulibus filiformibus humifusis, foliis ovatis acutis, floribus apetalis, pedunculis fructiferis rectis. Annua, 3–5. In cultis humidis solo arenoso." Its synonymy is—

Alsine pallida, Dum. Fl. Belg. Prod. 109 (1827); Piré in Bull. Soc. Bot. Belg. ii. 43.

Stellaria Boreana, Jord. Pug. 33 (1852); Bor. Fl. du Centre de la France, ed. 3. 104.

S. apetala, Bor. "Not. et Fl. du Cent. ed. 2. 87," nec Ucria in Rœm. Archiv, i. 67.

Willkomm remarks (Ic. et Desc. Pl. Eur. Aust. Occid. i. 89) that *S. Boreana* does not differ from the apetalous state of *S. media*, which is found in Germany: "in utraque stirpe caulis unifariam villosus, petioli ciliati, pedunculi et sepala hirsuta, folia punctata, capsula seminaque eadem configuratione et cet." Nor can I find any permanent distinctive character.

The appearance of *A. pallida* is well marked, and renders it unlikely to escape the notice of a critical field-botanist. A number of the seeds germinate in near proximity, and produce a dense mass of plants which spread from that centre in a circle; an appearance well represented in M. Piré's plate (Bull. Soc. Bot. Belg. l. c.), but which was unintelligible to me until I had seen the plant growing abundantly in Norfolk. Its pale colour also cannot fail to attract notice.

This plant is probably a native of many parts of the country; it inhabits a damp sandy soil. It flowers in the months of April and May, and has usually (always ?) shed its seed and withered before the end of the latter month. If the plants did not grow in society, they might easily escape notice, for individually they would be very inconspicuous,

and to appearance flowerless. My specimens are from St. Helen's Spit, Isle of Wight, where it was found by Mr. A. G. More, in May, 1858, and properly named by him; and from Bluntisham, Hunts., gathered in 1846 by Mr. Newbould. In May, 1864, I met with it in abundance on recently reclaimed and at present nearly barren sandy ground at Holme-next-the-Sea, in Norfolk. It there formed dense prostrate masses of plants all spreading from one centre, and often covering a space of a foot in diameter. The individual plants were so matted together as to render it impossible to separate them without very extensive injury.

Mr. More supplied me with seed of his plant in 1859, and I have grown it in pots each year since that time. The plants are exactly like the wild specimens, but less luxuriant. They are now (May 28) beginning to fade, and will manifestly not live much longer.

There is no doubt that the original *Alsine* of Linnæus is typically represented by our *Stellaria media*, and it is unfortunate that Wahlenberg applied that name, rendered vacant by the transfer of *A. media* to the genus *Stellaria*, to species which Linnæus would not have so named. The *Alsine*, Linn., and *Alsine*, Wahl., are totally distinct genera, whatever opinion we may hold concerning the relationship of the former to the Linnæan *Stellaria* as represented by *S. nemorum* and *S. Holostea*, and of the latter to the genus *Arenaria*, as now restricted by many botanists. It seems scarcely expedient to attempt a return to the Linnæan nomenclature; for I do not think that a natural classification is produced thereby. The distribution of the *Alsineæ* into genera is very unsatisfactory. We must wait until some botanist discovers the true principle of classification in this group. Meanwhile it is clear that those who separate our present plant specifically from *S. media* are bound to adopt Du Mortier's name *pallida* in place of Jordan's more recent term *Boreana*.

ON SOME GENERA WITH ONE-CELLED OVARY, REFERRED TO *HEDERACEÆ*.

By Berthold Seemann, Ph.D., F.L.S.

Whilst searching for satisfactory limits between *Apiaceæ* (*Umbelliferæ*) and *Hederaceæ*, I have been led to examine the genera with one-

celled ovary referred to the latter, and justly considered an anomaly in a group where the bulk of the plants have ovaries from 2- to many-celled. These genera are *Arthrophyllum*, Blum., *Bursinopetalum*, Wight, *Pukateria*, Raoul, and *Cuphocarpus*, Dcne. et Planch.

Arthrophyllum, Blum., an East Indian genus of trees, presents, as now described, the additional anomaly of having opposite pinnate or bipinnate leaves with opposite leaflets, all the other *Hederaceæ* having alternate ones, with the apparent exception of the Sandwich Islands genus, *Cheirodendron*, Nutt., where those of the terminal flowering branches are opposite. The idea of removing *Arthrophyllum* to *Cornaceæ*, in which Order one-celled ovaries are admissible, has probably occurred to all who reflected on the subject, but in that Natural Order, as now constituted, no plants with bipinnate leaves are to be found. The difficulty, however, admits of a solution. If *Cornus Suecica*, Linn. (Fl. Lapon. t. v., Engl. Bot. t. 316), be examined, it will be seen there is a subterranean rootstock which throws out ramified branches with simple opposite leaves and often terminal flowers. As soon as the fruit is ripe, these branches wither and die off. Now, if this subterranean rootstock were erect, *Cornus Suecica* would be exactly like *Arthrophyllum*, and the annual branches would probably be mistaken for leaves, as those of the Indian genus were. What I maintain, then, is that *Arthrophyllum* has annual, deciduous, occasionally dichotomous branches, or rather branchlets (like *Cicca disticha*) with opposite simple and entire leaves, the terminal ones of which produce flowers and fruit. The real branches (as in *Phyllanthus*, *Cicca disticha*, and *Cornus Suecica*) are woody, and do not fall off as the branchlets do. In the absence of specimens, an inspection of t. 14 of vol. i. part 1 of Miquel's Fl. Nederl. Ind., representing *A. ovalifolium*, Jungh. et De Vries, will tend to make this clear. There is therefore no reason why the genus *Arthrophyllum* should not be incorporated with *Cornaceæ*.

Bursinopetalum, Wight, was placed by its founder in *Olacineæ*, by Miers in *Aquifoliaceæ*, and by Thwaites (Kew Misc. vii. p. 242) in *Araliaceæ*, in which he was followed by C. Koch ('Wochenschrift,' 1859, p. 372). But in a subsequent publication (Enum. Ceylon Plants, p. 42) Mr. Thwaites, abandoning his opinion, referred it once more to *Olacineæ*. More recently Bentham and Hook. fil. (Genera Plant. p. 345) assigned to it a place amongst *Cornaceæ*, with which arrangement I concur.

Pukateria, Raoul, which C. Koch, in his enumeration of garden *Hederaceæ* ('Wochenschrift,' 1859, p. 372), still retains amongst *Hederaceæ*, has long since been identified by Hook. fil. (Fl. New Zealand, i. p. 98) with *Griselina*, Forst. (*G. lucida*, Forst.), a genuine *Cornacea*.

Cuphocarpus, Dcne. et Planch., is but imperfectly known from the revision of *Hederaceæ*, published by Decaisne and Planchon in Rev. Hort. 1854, p. 109, where it is stated to be a spiny Madagascar tree, with articulated pedicels, tetramerous flowers, calyptrate petals, solitary style, and 1-celled ovary. Tetramerous flowers are frequent in *Cornaceæ*, and so are solitary styles and 1-celled ovaries. However, until more is known of the plant, one can hardly venture an opinion, but at all events the genus would be much better placed, if even temporary only, in *Cornaceæ*, where 1-celled ovaries are a recognized feature in the most typical members, than in *Hederaceæ*, where, after the exclusion of *Arthrophyllum*, *Bursinopetalum*, and *Pukateria*, no genera with 1-celled ovaries are now retained.

The following is a list of the plants under consideration :—

I. *Arthrophyllum*, Blum. Bijdr. 878; De Cand. Prod. iv. p. 266; Endl. Gen. n. 4562; Dcne. et Planch. Rev. Hort. iv. ser. (1854) vol. iii. p. 109; C. Koch, Wochenschrift, 1859, p. 370.

1. *A. Javanicum*, Blum. l. c.; De Cand. l. c.; Java (*Blum.*).

2. *A. Blumeanum*, Zoll. et Moritz, Syst. Verz. p. 41.—A. diversifolium, *Bl. l. c.; De Cand. l. c.* A. ellipticum, *Bl. l. c.; De Cand. l. c.* Java (*Blum.*), Sumatra.

3. *A. ovalifolium*, Jungh. et De Vries, Ned. Kruidk. Arch. i. p. 19; Miquel, Fl. N. Ind. vol. i. part 1, p. 768, tab. 14. Sumatra (*Junghuhn*), Java.

4. *A. dilatatum*, Miq. Fl. N. Ind. vol. i. part 1, p. 768. Java (*Horsfield!* in British Museum).

II. *Bursinopetalum*, Wight, Spic. Neilgh. i. 22, t. 22, et Icon. Plant. t. 956; Walp. Ann. i. p. 126, et v. p. 85; Thwaites in Kew Misc. vii. p. 242.

1. *B. arboreum*, Wight, l. c.; Walp. l. c.—In woods near Sispara (*Wight*), Ceylon, 4–7000 feet above the sea (*Thwaites*).

2. *B. tetrandrum*, Wight, ms. in Thwaites, Enum. Ceylon Plants, p. 42. Ceylon (*Thwaites*).

III. *Griselina*, Forst. Prodr. n. 401; Endl. Gen. n. 6886.—Sco-

polia, *Forst. Gen. t.* 70. Pukateria, *Raoul, in Ann. Soc. Nat.* 1844, p. 120.

1. *G. lucida*, Forst. Prodr. n. 401.—Scopolia lucida, *Forst. Gen. p.* 140, *t.* 70. Pukateria lucida, *Raoul, l. c.* Griselina lucida et littoralis, *Raoul, Fl. N. Zeal. p.* 22; *Hook. fil. Fl. N. Zeal.* i. *p.* 98. New Zealand (*Forster*).

IV. *Cuphocarpus*, Dcne. et Planch. Rev. Hort. iv. ser. vol. iii. 1854, p. 109.

1. *C. aculeatus*, Dcne. et Planch. l. c.—Gastonia aculeata, *Hortorum.* Madagascar (*Du Petit Thouars.*).

OFFICIAL REPORT ON THE BOTANICAL DEPARTMENT OF THE BRITISH MUSEUM.

By J. J. Bennett, Esq., F.R.S.

The principal business of this department during the year 1863 has consisted in the naming, arranging, and laying into the General Herbarium of various collections of plants from the Sandwich Islands and from the islands of the South Pacific; of Pavon's collections of Mexican and Spanish plants; of Professor Pallas's herbarium of European and Siberian plants; of the collection of Nepaul plants of Dr. Hamilton Buchanan; of a further portion of Mr. Thwaites's plants of Ceylon; of Mr. Forbes's plants of Madagascar and Mozambique; of Martin's and Schomburgk's Guiana plants; of Dr. Gillies's collection of Chilian *Compositæ;* of an extensive collection of plants of Southern Africa from various collectors; and of numerous specimens of *Hepaticæ* from the Cape of Good Hope, and from other quarters. In the re-arrangement of various families of plants, including *Coniferæ*, the genus *Quercus*, *Characeæ*, and portions of the general Cryptogamic collection, as well as of several portions of the collection of fruits and seeds, especially those of the family of Palms. In the examination of the various collections recently received, and their partial arrangement, with a view to their incorporation in the herbarium. In the arrangement of large specimens of Australian woods, and of some of the larger and more remarkable fruits, in the exhibition cases of the public rooms. In the re-arrangement of various portions of the British

herbarium, especially the Mosses, Hepaticæ, Algæ, and Fungi, with the addition of numerous specimens from the herbarium of Mr. Lyle, and from other collections. And in the continued examination of the Sloanean herbarium, especially in reference to British plants.

Mr. Bennett has to acknowledge the great kindness of Mrs. Gray, in undertaking and completing the re-arrangement, with large additions, of the British collection of *Algæ;* and the unremitting attention bestowed by the Rev. W. W. Newbould on the British collection generally, and on the British plants of the Sloanean herbarium in particular.

The following are the principal additions which have been made to the department during the same period, by purchase or donation:—500 species of British plants from various collectors. 126 species of rare or critical British plants, presented by A. G. More, Esq. 67 species of British *Algæ*, including two fine specimens of *Codium Bursa*, L., collected by Miss Poore and Miss Scott. 32 species and varieties of the genus *Mentha*, from the herbarium of Dr. Wirtgen. 103 species of *Cichoraceæ*, prepared by Dr. Schultz, of Deuxponts. 2300 species of German plants, forming part of the "Flora Germaniæ Exsiccata" of Professor Reichenbach. 1580 species of plants of the Tyrol, from the Ferdinandeum at Innsbruck. 387 species of *Hepaticæ* and Mosses, collected in and near the Pass of the Simplon, presented by Professor Gagliardi. 105 species of *Hepaticæ* and Lichens, forming part of Rabenhorst's 'Hepaticæ' and 'Lichenes Europæ.' 129 species of plants of Ceylon, collected by Mr. Thwaites. 690 species of plants of Southern and tropical Australia, collected by Dr. Ferd. Müller. 89 species of plants of Lizard Island, collected by Mr. M'Gillivray. 457 species of plants of Tasmania, collected and presented by Dr. Milligan. 128 species of *Algæ* of Tasmania, from the Rev. P. Parry Fogg. 190 species of plants of Sierra Leone, from various collectors. 162 species of plants from the river Zambesi, collected by the Rev. J. Stewart. 1365 species of plants of the Cape of Good Hope, from various collectors. 27 species of *Algæ*, collected at Algoa Bay. 87 species of plants of Madagascar, collected by M. Helsinberg. 340 species of Cryptogamous plants of South Carolina, collected by Mr. Ravenal. 218 species of plants of Panamá, collected by Mr. Sutton Hayes. 80 species of plants of Jamaica, presented by the representatives of Henry Osborne, Esq. 18 species of plants of Peru, from the mountains of the province of Iquiqué, collected by Mr.

Bollaert. 250 species of *Compositæ* from Chili, collected by Dr. Gillies. 100 microscopic slides of species of *Diatomaceæ*, prepared by Mr. Baker. The British herbarium of Dr. Pulteney. The herbarium of plants of South Carolina, formed by Mr. Walter, author of the 'Flora of South Carolina.' 450 species of fruits and seeds from Panamá, collected by Mr. Sutton Hayes. Fine transverse sections of the trunks of the White Oak (*Quercus alba*, L.), and of the Black Walnut (*Juglans nigra*, L.), presented by the Commissioners for Canada to the International Exhibition. Numerous Palm-seeds and fruits, collected in Camboja, Ceylon, Labuan, and Mauritius.—*Parliamentary Papers.*

CATABROSA VILFOIDEA, Andr.

In making up the last number of the Journal, a paragraph of the Spitzbergen paper relating to this new Grass has been misplaced. At p. 166, the paragraph commencing "Superficially, this little Grass," etc., should immediately succeed the technical Latin description of *Catabrosa Vilfoidea*, to which it relates, and the paragraph 90 (*Catabrosa algida*) should be placed immediately before 91 (*Festuca hirsuta*). —Editor.

ANALYSIS OF CHINCHONA BARK AND LEAVES.

Communicated by Clements R. Markham, F.L.S.

Letter from W. G. M'Ivor, Esq., Superintendent Government Chinchona Plantations, to the Secretary to Government, Fort St. George.

Ootacamund, 17th March, 1864.

Sir,—1. I have the honour to forward by banghy a box containing a further supply of Chinchona bark and leaves, as per list annexed, for transmission to the Right Honourable the Secretary of State for India, in order that they may be submitted to Mr. Howard for analysis and report.

2. The bark and leaves now forwarded were removed from the plants on the 24th of February last, being the dry season of the year,

or the period when they are at rest, notwithstanding the bark was found to separate freely from the stems; therefore if these specimens are found to contain a larger percentage of alkaloid than those previously submitted, this will no doubt be the most favourable season of the year for peeling and drying the bark.

3. Further observation seems to establish that the plants will give a fair yield of bark annually from lopping and pruning, on the principle suggested in my letter of the 4th June, 1861. In accordance with this system of pruning, I removed two of the lower branches from a plant of *Chinchona succirubra* two years and five months old. The bark of these branches form specimens Nos. 1 and 2, and give a total weight of $21\frac{5}{8}$ tolas, or about $8\frac{1}{2}$ ounces of dry bark. I expect that No. 1 will be valuable; No. 2 is from the very small succulent branches, consequently its yield in alkaloid may not be of sufficient value to pay the cost of preparation and transport. I am anxious that Mr. Howard should give the probable market value of these two samples of bark, in order to enable us to form an approximate estimate of the yearly returns from loppings and prunings, as I feel convinced that this will be our principal source of revenue, at least for many years to come, especially as the system tried experimentally of removing strips of bark from the stems of the plants has been found to injure their growth, and therefore cannot be profitably practised.

Chinchona succirubra.

No. 1. Bark from the thickest part of two lower branches of a plant of *C. succirubra* two years and five months old. This bark when fresh, *i.e.* immediately after being removed from the branches, weighed 37 tolas;* one hour's drying reduced the weights to 32 tolas, and when perfectly dry it was found to have decreased in weight to $12\frac{1}{8}$ tolas, giving a loss of about two-thirds in drying.

2. Bark from the spray or small portions of the same branches as No. 1. This bark when fresh weighed 40 tolas or 1 lb., in one hour's drying its weight was reduced to 31 tolas, and when thoroughly dry to $9\frac{1}{4}$ tolas, making the loss of weight in drying fully three-fourths.

3. Bark from the stems of *C. succirubra* from plants of sixteen months' growth, weighing $18\frac{3}{8}$ tolas of dry bark.

* 40 tolas make 1 English pound, and consequently $2\frac{1}{2}$ tolas = 1 ounce.

4. Bark from the small branches of the same plant as No. 3, weighing $12\frac{5}{8}$ tolas of dry bark.
5. Dry leaves of *C. succirubra*.
6. Specimens of the wood of *C. succirubra*, from which strips o bark had been previously removed, showing the injury *don to the stem by this process.*

(Signed) W. G. M'Ivor,
Superintendent Government Chinchona Plantation.

From W. G. M'Ivor, Esq., Superintendent of Government Chinchona Plantations, to J. D. Sim, Esq., Secretary to Government Revenue Department, Fort St. George.

Ootacamund, 19*th March*, 1864.

Sir,—In continuation of my letter of the 17th instant, I have the honour to inform you that I have this day forwarded by banghy a portion of the bark belonging to sample No. 3, which, unfortunately by an oversight, was omitted to be packed; this makes the total weight of dry bark of No. 3 specimen 33 tolas, viz. $18\frac{3}{8}$ tolas previously forwarded, and $14\frac{5}{8}$ tolas now submitted; and will feel obliged by your having the goodness to correct the list accordingly.

Report of an Analysis of the Third Remittance of Bark from India.*

Letter from J. E. Howard, Esq., to the Under Secretary of State for India, *June* 15*th*, 1864.

Sir,—I have the honour to report that I received, on the 20th May, the specimens mentioned by Mr. M'Ivor in his dispatch of the 17th March last, and that the same were all in good condition.

I have since devoted most careful attention to ascertain by experiment the probable market value, especially of the first two samples of bark sent. It will not be necessary for me to detail the various means by which I succeeded in convincing myself, not only of the existence of the alkaloids, but of their being extant in such a state of purity as is certainly not found in the ordinary samples of red bark imported from South America. The result of my examination tended to show distinctly, that cultivation has improved the produce of at least this species of Chinchona.†

* The first remittance was received in the spring of 1863, and the second in October, 1863.

† The same does not seem to hold good of the *C. Calisaya* in Java.

I must remark that the commercial value of specimens of bark intended for the manufacturers of sulphate of quinine can never be ascertained by the mere knowledge of the percentage of alkaloid soluble in ether, since it is necessary that this should be shown to exist in such a state as to crystallize with acids into the required compounds.

In the case of No. 1, the bark from the thickest part of the lower branches of a *C. succirubra*, two years and five months old, this examination was most satisfactory, confirming that which I stated in my first report as to the facility with which the alkaloids were obtained in a state of purity, although the amount of red colouring matter in the bark is very great. The amount of purified alkaloids I estimate at 6 per cent., consisting of Quinine 3·14, Chinchonidine 2·06,‡ Chinchonine 0·80. This large product of alkaloids might probably be still further increased by surrounding the stem with moss, in the manner in which Mr. M'Ivor has so happily suggested, since Dr. de Vry found 8·409 per cent. of alkaloids in a stem which had been so treated. It seems to me, from this trial, that the East Indian bark, the produce of *C. succirubra*, will rival in price the Bolivian *Calisaya*, which is by no means the case with the bark of the branches of the *C. succirubra* as grown in South America. It is important to remark that the very high price of between 8*s*. and 9*s*., which has quite recently been paid for red bark in this market, applies only to those pieces of bark from the trunk of the tree which possess, from their age, a peculiarly bright-red appearance. I have forwarded a small phial with commercial Sulphate of Quinine obtained from this No. 1, as also Sulphate of Chinchonidine separated from the above. I have only to remark further on this bark that its appearance bespeaks its good quality, and that there can be no doubt the season chosen (24th of February) is most favourable to its being well secured.

Of No. 2 I cannot speak so favourably. This consists of the very minute bark from the spray or small portions of the same branches as No. 1. From this I did not succeed in obtaining more than 0·9 per cent. of *impure* alkaloid, which lost one-half in the attempt to purify, since the alkaloids are much implicated with tannin (apparently), and not capable of easy crystallization. I would suggest that the best destination for the bark of these small branches might probably be to sell it to the druggist for pharmaceutical preparations, for which pur-

* Forming a resinous hydriodate.

pose it is well adapted, as being quite equal to much that is brought from Peru for this purpose. I do not think that it could be considered worth any price for manufacturing purposes.

No. 3. Bark from plants of *C. succirubra* of sixteen months' growth yielded me not quite 3 per cent. of alkaloid, which I estimate as follows,—Quinine and Chinchonidine, 2·45, Chinchonine, 0·52; total, 2·97 per cent.

The consideration of this specimen forcibly suggests the desirability of giving the bark as long a time as possible to mature, since the additional thirteen months of No. 1 specimen have much more than doubled the commercial value of the bark, the proportion of Quinine, which could be easily obtained crystallized as sulphate, being about one-third of No. 1 specimen.

No. 4 resembles No. 2. I may remark that I find the alkaloid (or alkaloids) in the leaves in a highly exceptional, and, I suppose, transitional state, and one rapidly passing under the influence of the oxygen of the air into that of the Quinoidine of commerce. The young shoots appear to contain the alkaloids in a more mature condition than the leaves, but still somewhat intermediate between these and the larger branches. It is obvious that further research on larger quantities of bark and leaves is needed to elucidate the difficult and interesting problems which arise in connection with the question how the alkaloids are built up in the plant itself.

I have been asked by Mr. Markham to give an opinion "whether, even if the difficulties in the way of carrying on delicate chemical processes might prevent success in obtaining pure commercial Quinine in India, yet still a rough substance might not be produced which would be efficacious as a febrifuge, and which might also be imported into Europe for the manufacture of Quinine, instead of sending home many times the bulk and weight of bark." My reply is, that experience has hitherto shown, by the failure of the very numerous attempts in this direction, that the collectors and importers reap in the end more profit from sending in to the European market the raw material than the half-manufactured product. This latter would command no price worth mentioning as a febrifuge *per se*. It would simply come into competition with the Quinoidine and refuse product of the bark operation. As to the reasons why it is not profitable to bring the product into a smaller bulk for facility of transport, they depend in part on the com-

plexity of the organic constituents of the barks, leading (especially under the influence of lime or alkalis) to deteriorating changes in the alkaloids, and partly also to the tendency of the heat to which the product must be subjected operating in the same direction. If I had a bark plantation in India, I should unquestionably order the bark sent home, even if I had skilful and experienced workmen to whom the task could be safely confided in India of attempting to reduce the cost of transport.—I have, etc.,

JOHN ELIOT HOWARD.

CORRESPONDENCE.

Conservancy of Chinchona Forests in New Granada.

21, *Eccleston Square, June* 13, 1864.

The following letter from New Granada may be of interest to the 'Journal of Botany.'

Yours, etc.,

CLEMENTS R. MARKHAM.

"*Bogotá, March* 4, 1864.

"MY DEAR SIR,—I have to thank you for having sent me a copy of the 'Edinburgh Review' of last year, in which I have had the satisfaction of reading the article on the cultivation of Quina-trees in the East Indies. Permit me to congratulate you on the successful result of this undertaking, which partly ensures the supply of so precious a drug for the future. It appears to me that the principal motive which induced the government of India to commence this cultivation, after overcoming so many difficulties, was the fear that the Quina-trees would be extirpated, in consequence of the disorder and waste that is allowed in the woods, where they are destroyed by the barbarous method of pulling up the roots. Fortunately this destructive method, which, without any doubt, would extirpate this precious plant in a few years, is only practised in the forests of Pitayo, where it is due to the immoderate desire for making money, which has taken possession of the Indians who own the greater part of the land; but in none of the other establishments for the collection of bark in this country has a similar scandal been repeated. On the contrary, beneficial rules are observed for the conservancy of the woods, more especially in those where I have a proprietary interest. The method consists in leaving a part of the trunk, about three feet in height, whence shoots may sprout; and in clearing away the surrounding trees to enable the rays of the sun to penetrate. By this means most of the trees that are cut down quickly shoot up, and, the rays of the sun penetrating to the cleared ground, the seeds which fall

from the tree germinate freely. Thus we have the satisfaction of seeing, in the forests worked on this principle, that the trunks of cut trees send out new shoots, and that the young plants grow vigorously. This result gives us full confidence that the good kinds of Quinas, which exist in this country, will be permanently preserved.

"To dissipate the apprehension that a day may arrive when humanity will be deprived of this most useful remedy, by the destruction of the forests which contain it, I think it will be sufficient to point out our "Andes," which, from the frontier of Brazil and Bolivia to the snowy summits of Cachiri and Cocuy, contain the different species of Quinas described by the learned Mutis, Caldas, and Humboldt, in abundance. Some of these species do not now find a place in the European markets, because they cannot fetch a remunerative price, owing to their inferior quality—only containing 1 to 2 per cent. of alkaloids—Quinine, Chinchonidine, Chinchonine, and Quinidine. But I hope that, in course of time, when the roads of this country are improved, and when the increased demand for this drug has caused its price to rise, the inferior drugs may be exported, and the vast forests may be worked with advantage to humanity as well as to the speculators. But in spite of the immense deposits of febrifuge barks which Providence has collected in our Cordilleras, I shall always consider the plantations which the foresight of the English government has established in the East Indies to be of great use, for they will hereafter supply the wants of those countries where the use of the drug is rapidly extending, as I learn from the same article in the 'Edinburgh Review,' where the value of the Quinine consumed during 1857 and 1858 is given at £54,500.

"From the above considerations, we may conclude that there need be no fear that humanity will see itself deprived of this precious medicine, seeing that as well in Bolivia as in Peru, Ecuador, and New Granada, the rule of cutting the bark according to a fixed plan is observed, and care is taken that the woods are replenished with increased numbers of plants of the best species, while some experiments have been made in forming plantations on land where the best conditions for their growth are found. From all this we hope that in a few years we may see magnificent results.

"Hoping that this short account may be of some use, I have the pleasure to repeat that, whenever you desire any information respecting the Quina trade in this country, I shall be happy to supply it so far as my limited knowledge will permit.

"Yours, etc.,

"Narciso Lorenzano."

Effects of Eating a Poisonous Fungus (Agaricus fertilis, *Pers.*).

June 13, 1864.

I beg to lay before you a few particulars about the ill effects experienced by myself and family from partaking of a specimen of *Agaricus fertilis*, gathered last autumn in Bishop's Wood. Having constantly eaten various species of Fungi, without unpleasant results, I was not sufficiently cautious in examining

this one. I had the same day seen a drawing of *Agaricus giganteus*, and thought the species gathered was the same, but did not refer to Berkeley, or I I should at once have seen my error. The upper part of the Fungus was prepared for luncheon, the stem and even part of the pileus thrown away. There was nothing at all unpleasant or acrid in the taste of it either when raw or cooked, but I ought to add that I kept my find under a propagating-glass for two days after gathering it. The Fungus having been cooked with butter, salt, etc., in the recognized way, I proceeded to test its gastronomic qualities, and found them of a high order. When cooked there was not more than half an ounce at most; of this I ate perhaps one-half, or quarter of an ounce, my wife two or three very small pieces, and one of my children (two years old) just tasted it. Now mark the effects of eating a Fungus not specified in Berkeley as poisonous or even suspicious! It so happened that morning that I had business in the City, and started by the North London Railway for Fenchurch Street about a quarter of an hour after partaking of the precious morsel. I can well remember that whilst waiting for the train, I was overtaken by a strange nervous, gloomy, low-spirited feeling, quite new to me. *However, I thought nothing of the Fungus.* By the time I reached Fenchurch Street, this feeling had considerably increased, accompanied by a dull headache, *but I still thought nothing of the Fungus.* My business took me through Billiter Street; on my way, passing some of the warehouses, I noticed the loading and unloading of certain goods that gave forth a powerful and oppressive odour. No sooner had I left Billiter Street than my headache became much worse, accompanied by an unpleasant swimming sensation, whilst two or three sharp pains shot through my stomach. By some strange process of reasoning I now attributed my indisposition to the stench in Billiter Street, an opinion retained till I reached home. My business only engaged me a few minutes, and then I made the best of my way to Fenchurch Street, my illness increasing with every step. *Still the Fungus never entered my mind.* When I reached the station my head was aching and my brain swimming to such an extent that I could hardly walk, while everything about me appeared to be moving with death-like stillness, either from side to side, up and down, or round and round. I staggered into a carriage and reached home in twenty minutes, so ill that I could hardly place one foot before the other, with the overpowering feeling of sickness increased to an unbearable degree; although there was no inclination to vomiting. I knocked at my door with the determination of going to bed directly, sending for the doctor, and making up my mind for a severe attack of brain or some other fever; *and all this time I had never once thought about the Fungus.* There was some delay in answering the knocks. The door was opened, however, in a few minutes by my wife, who could hardly walk, and could not speak for crying. Before I could say many words about the agony I was suffering, she let me know that she had been worse than I had been, that the child was downstairs in the arms of a neighbour, apparently in the last stage of existence (Mrs. Smith being too prostrated to hold her own child), while the servant had been sent out for the doctor.

When I saw how matters stood, my illness to a certain extent seemed to pass away, and on the emergency of the occasion, ill as I was, I went for medical assistance, which I was fortunate enough to procure readily. It appears directly I had started for the City, Mrs. Smith took our child out for a walk, but about half an hour after luncheon the same swimming of the head that attacked me came over her, and what with headache and sickness, she could hardly reach home. Directly she got into the house the little girl began to vomit, and the vomiting became so violent that by the time of my return from the City she was perfectly prostrated. On the first day Mrs. Smith and the child were much the worse of the three, but after the first and second days I was the greatest sufferer. The effect on my wife was utter prostration by the vomiting and nausea, and a feeling of loathing everything that was brought. At the end of the first day she had no strength to vomit, and brandy had to be freely administered. The little child was in a deep stupor or sleep, with her eyes wide open and fixed, her fingers occasionally clutching convulsively, and mouth twitching. At intervals of about five or ten minutes, a vomiting-fit appeared to come over her, by the heaving of her chest and stomach, but after the first hour she had not strength enough left for retching. The doctor administered two emetics and other medicine to her, and found it necessary to attend frequently for the first two days, and continue his attendance nearly a week. The child remained in the stupor for twenty hours, and after that time gradually regained strength. After two or three days, Mrs. Smith gradually got well, but that was not the case with me, who had eaten the lion's share. The feeling of sickness and nausea did not leave me for a fortnight, and for three or four days I ate comparatively nothing, and drank only coffee and milk. On the first day I had swimming of the brain to an alarming degree, a most distressing headache, vomiting and excessive purging. I note the latter particularly, as I was the only one of the three so affected. This lasted for four or five days, accompanied by a feeling of loathing, sickness, and lassitude. At nine in the evening of the first day, a drowsiness came over me, and I fell into a deep sleep for twelve hours, racked and harassed by dreams, in which Fungi, and particularly toadstools, always played a prominent part, advancing and retreating, increasing in size and diminishing in an endless maze, but always Fungi, poisoning by Fungi, poisoned children, dead fathers and mothers, etc. etc. etc. The sleepiness was shared by my family, but not to such an extreme degree, for after my twelve hours' sleep of the first night, I thought I could do a little work, but I fell into an uneasy though deep sleep in my chair at 10 A.M., and did not wake till 2 P.M. I took hardly anything to eat the rest of the day, and at 5 P.M. fell asleep again, and slept tolerably well till 9 A.M. the next day. On the second night I noticed that all the joints of my legs and feet were quite stiff, and I could not move them without pain, but in the course of a day or two this gradually passed off. For three or four nights I also noticed that when the drowsiness came on, a swimming of the head and sick feelings accompanied it, but it all gradually passed away during ten days or a fortnight. I had previously observed that my rabbits ate the porous stem of *Phallus im-*

pudicus quite readily, so when I had found out the effects of *Agaricus fertilis* I placed all that was left before them, but they refused to eat it.

Yours, etc.,
W. G. Smith.

History of the Sandal Wood.

Sydney, New South Wales, November 21, 1863.

I have just read a paper in the 'Intellectual Observer,' "On Sandal Wood and its Commercial Importance," and beg to refer you to the *true statement* of the Erromanga affair, so incorrectly rendered in several recent books of travel. This account of Erromanga and Tanna, published in the 'Asiatic Journal' of 1832, I lent to poor Williams, during his visit to Sydney, and warned him of the treacherous nature of the natives. You will be able to refer to my account of the Sandal Wood in Loudon's 'Magazine of Natural History,' vol. v. p. 255. George Bennett.

NEW PUBLICATIONS.

Morphologische Untersuchungen über die Eiche. (Morphological Examinations of the Oak, etc.) Von Dr. Heinrich Möhl. Cassel, Fischer, 1862. 4to, pp. 35, tab. 3.

The principal topics referred to in this *brochure* are, the condition of the leaf-bud in the resting stage, as well as during expansion, the yearly growth of the shoots, the phyllotaxis of the bud-scales, the form of the leaf, its nervation, its lobes, and its æstivation. Dr. Möhl devotes some space to a subject that may be of interest to our readers, viz. the method of distinguishing the two reputed species of Oak, *Quercus sessiliflora* and *Q. pedunculata*, the one from the other, by the buds and twigs, as well as by the general form of the leaf and of the tree, thus rendering us independent of the female flowers or fruits.

The bud of *Q. sessiliflora* tapers from below upwards, and is traversed by five well-marked longitudinal ridges. The bud-scales are arranged in spiral cycles, the direction of which is very oblique, so that the successive scales of the same series only overlap one another to a slight extent at the base, but each scale covers over the lower half of the one placed immediately above it, in the adjacent cycle. The bud of *Quercus pedunculata*, on the other hand, is shorter, broadly ovate, less acutely pointed, its scales are strongly developed, and apparently

irregularly distributed in four widely-separated spiral ranks, so that the half of each scale is uncovered, although the successive scales of the same continuous cycle frequently overlap one another at the base to the extent of half their surface. In both species the shoots bear a tuft of leaf-buds at their extremity, but in *Q. pedunculata* these buds are more numerous, less closely crowded, and more vigorous, than in *Q. sessiliflora*. In the former the end-bud is surrounded by a number of strong *active* buds, in the latter the end-bud is encircled by a number of abortive side-buds, the *active* buds being, moreover, not so densely packed as they are in *Q. pedunculata*, but more distant one from the other, owing to the early development of the internodes. In shoots of very old trees, on the other hand, in which the terminal bud is almost always abortive, the active side-buds are thrust forwards into a cluster, so that in thiscase the shape of the bud supplies the only means of distinguishing the two species. The form of the leaves affords the most definite characters. In the recently opened bud of *Q. sessiliflora*, the young leaf is elliptic, provided with a long stalk, its secondary nerves are very prominent, and project beyond the margin of the lobes in the form of little spiny points. The young leaf of *Q. pedunculata*, on the other hand, is very shortly stalked, spathulate, twisted, its lobes are long, narrow, and wavy, separated one from the other by deeper notches than in the other species. The fully developed leaf of *Q. sessiliflora* is almost rhomb-shaped, with a stalk of considerable length, the two halves of the leaf-blade are nearly symmetrical; and the base is divided into two ear-shaped lobes, which are decurrent along the sides of the leaf-stalk. The leaf of *Q. pedunculata* has a very short stalk, is spathulate, and its two halves are mostly unsymmetrical. The secondary nerves scarcely reach the margin of the lobes, but break up into a network, and anastomose with the tertiary nerves. The lobes are more sinuous in outline than in *Q. sessiliflora*, and are slightly emarginate at the apex, so that the extremity of each lobe is somewhat heart-shaped. The base of the leaf is very wavy, and is divided on either side of the leaf-stalk into ear-shaped appendages.

If the characters thus mentioned by Dr. Möhl were invariable, and always as clearly discernible as they appear in the lithographs accompanying this memoir, there would be little difficulty in coming to a decision as to which species a twig, with the buds attached to it, might belong; but, so far as our own experience goes, the points of discrimi-

nation pointed out by our author are as variable as those derived from the length of the leaf-stalk or of the fruit-stalk are admitted to be. We have before us, as we write, twigs gathered from the same tree,—a pollard truly,—presenting great diversities in the form and disposition of the buds, as well as in the arrangement of the scales. Too much reliance, then, must not be placed on these points, though we may be thankful for any additional means of arriving at a solution of what has often proved a *vexata quæstio*. As to the general appearance of the two forms, the author shows how the shape of the tree and its general habit depend on the arrangement of the twigs, the abortion of some buds and the lengthening of others, and thus accounts for the rounded form of *Q. pedunculata*, and its tortuous, jagged branches, as contrasted with the pyramidal shape of *Q. sessiliflora* and its more slender branches.

In conclusion, it is pointed out that there is an analogy between the form of the leaf and that of the tree, and between the arrangement of the nerves of the leaf and the disposition of the branches, so that, as has frequently been remarked in other cases, the tree is but as an enlarged copy of the leaf. Our readers will recall Dr. M'Cosh's observations on this curious subject, but may not be familiar with Mr. Ruskin's explanation of the varying forms of trees,* as illustrated by that of the Oak among others, and which is well worthy the attention of morphologists.

Notes extraites d'un Catalogue inédit des Plantes Phanérogames du Département du Cher. Par A. Dèsèglise. Angers. 1863. Pp. 21.

The department of the Cher is comprised within the inland but yet lowland portion of the great basin of the Loire, and takes its name from a branch of that river, which rises on the north-western edge of the Auvergne hills. It is included within the district embraced by Boreau's 'Flore du Centre.' The flora of the department has been carefully studied by M. Dèsèglise, who has contributed to M. Boreau's work the result of his researches, and who is known also as the author of an elaborate monograph of the French Roses. He has prepared a Flora of the department, which he has hesitated to publish in a complete form, and upon this the present pamphlet, which contains an ac-

* 'Modern Painters,' vol. v. p. 28, etc.

count, with descriptions of critical species, of his discoveries since the date of the last edition of the 'Flore du Centre,' is based. We will select from it a few of the critical notes which are most likely to interest our readers.

His *Barbarea stricta* is evidently the same plant as ours, and he says that whilst he has seen *B. vulgaris* in the department in two localities only, both of which are in the vicinity of habitations, *B. stricta* is plentiful in woods and damp places.

Capsella rubella of Reuter (*C. rubescens*, Personnat) he describes as follows:—Leaves dark-green, the lower ones and the root-leaves lyrate-pinnatifid, the upper ones entire and narrowly sagittate at the base; sepals glabrous, oblong, reddish at the apex, surrounded by a narrow membranous border; petals scarcely longer than the calyx, equalling the stamens; silicles equalling the pedicels, emarginate at the apex, shortly apiculate by the style; seeds small, brown, five or six in each cell. It has been gathered in Switzerland, Savoy, and numerous stations in the southern half of France. We have seen authenticated specimens both from Switzerland and France, but in these the pedicels are longer than the silicles, and the only notable difference which we can detect between this and our common *C. Bursa-pastoris*, is in the sepals, which are conspicuously pellucid all round the edges, and the central portion bright red in hue, and in the larger and longer petals of this latter. Upon looking over our British specimens of *C. Bursa-pastoris*, we find an example with petals almost double the length of the sepals, but these latter have a decidedly reddish tinge and a slightly membranous border, so that we cannot accept *C. rubella* as more than a variety.

Viola Biturigensis of Boreau is an interesting discovery. It is nearest to *V. stagnina*, and has a similar habit of growth, but the flower is much larger, the spur of the corolla more than half as long again as the calycine appendages, and the leaves are oval-acuminate or lanceolate instead of subcordate.

Under *Arenaria serpyllifolia*, M. Martrin-Donos ('Notes sur la Flore du Tarn') distinguishes three plants as follows, exclusive of *Lloydii*. 1. *A. leptoclados*, Guss., easily distinguished by the tenuity of all its parts, and its slender oval-elongated capsule, which yields to pressure without bursting. 2. *A. serpyllifolia*, L., with slightly spreading panicle, erect fruit-pedicels, sepals shorter than the oval subglobose

capsule, which breaks with a noise under pressure. 3. *A. sphærocarpa*, Ten., panicle ample, very spreading, fruit-pedicels almost divaricated, sepals equalling or exceeding the subglobose-conic capsule, which is crustaceous, and breaks also with a noise. As M. Dèsèglise remarks, no dependence can be placed upon the relative length of the sepals and capsule, so that in England we shall doubtless not be disposed to admit the two latter, and *A. Lloydii*, except as varieties, and according to Mr. Symes's manner of classification, *A. leptoclados* as a subspecies.

Hypericum lineolatum M. Dèsèglise distinguishes from *H. perforatum* by its stems thicker with more open branches, broader, almost amplexicaul leaves, corymbiform panicle, pedicels shorter than the calyces, sepals slightly denticulate at the apex, charged on the outside with points and scattered lines, paler petals marked on the back with black lines, and by its shorter capsules.

These notes will sufficiently serve the purpose of showing the character of the pamphlet.

Essai d'une Flore Mycologique de la région de Montpellier et du Gard.—Observations sur les Agaricinés, suivies d'une énumération méthodique. Par J. de Seynes. Paris: Rothschild. 1863.

The one hundred and fifty pages which M. de Seynes' 'Essai' occupies are divided nearly equally between the introductory chapters and an enumeration (with brief notes) of the *Agaricini*. The volume contains a map of the district included in the Flora, and five analytical plates. In the first chapter the limits of the district are indicated. These include the Departments of Hérault and Gard, lying between the Rhone on the east and the Cevennes mountains on the west, and from the Mediterranean on the south to the river Ardèche, from its rise near Villefort to its confluence with the Rhone, on the north. Our author then notices the contributions made towards a Flora of this district from the time of Magnol (1676) to the present. The second chapter is devoted to the structure of Agarics, and in particular to the *hymenium*. In Chapter III. the spore, its dissemination and germination, is treated of; and in the fourth chapter a general view is given of the reproductive organs of the Hymenomycetes. Chapter V. is occupied with the subject of geographic distribution and the determination of zones; whilst the sixth chapter contains a brief apology for the au-

thor's classification. It is the last chapter and the methodic enumeration which contain the greatest novelties in the 'Essai.'

M. de Seynes divides the *Agaricini* into two great sections, based on the colour of the spores, *i. e.* into the *Chromospori* and the *Leucospori*. The former of these he places first, and under it includes the following genera, in the order in which they are named :—*Montagnites*, *Coprinus*, *Coprinarius*, *Pratellus*, *Derminus*, *Bolbitius*, *Cortinarius*, *Gomphidius*, *Paxillus*, *Crepidotus*, *Hyporhodius*, and *Volvaria*. The *Leucospori* include *Amanita*, *Lepiota*, *Armillaria*, *Tricholoma*, *Hygrophorus*, *Clitocybe*, *Pleurotus*, *Mycena*, *Omphalia*, *Panus*, *Lentinus*, *Marasmius*, *Collybia*, *Lactarius*, *Russula*, *Cantharellus*, and *Schyzophyllum*. At the first glance he would appear to have reverted to the arrangement of the 'Systema Mycologicum' of Fries, but this vanishes upon a better consideration. It is true that, seemingly devoid of confidence in what he has done, he calls them all *Agaricus* in his enumeration, with his generic names in brackets, so as to give them apparently only a subgeneric value; but, whatever value he chooses to place upon them, he evidently desires that all the groups shall be accepted as of equal value; and if *Panus* and *Lentinus* are to be treated as genera, so therefore should *Mycena* and *Omphalia*. There is ample room for a revision of the genus *Agaricus*, even as understood by Fries in his latest works; but whether this effort will be accepted as a basis must be left awhile for the consideration of mycologists. Some will probably doubt whether the succession adopted is the best which could be suggested, others whether the genera (?) are all equally well characterized, whilst others again will continue to swear by the 'Epicrisis' and 'Summa Vegetabilium Scandinaviæ,' and turn a deaf ear to all proposals to amend this portion of the system matured by Fries. Each and all will doubtless hesitate ere they accept M. de Seynes' classification of the *Agaricini* as a basis for future operations. Although it may be a *novelty*, it is a question whether it may not be more honoured in the breach than in the observance.

Two hundred and nineteen species are included in the enumeration, but a belief is expressed that nearly double that number would be attained if the whole district were carefully and systematically examined. Floras of this kind are exceedingly valuable in estimating the distribution of species, and whatever differences of opinion may be entertained of the value of his arrangement, there will be unanimity

in welcoming M. de Seynes' 'Essai' as a useful contribution to our mycological literature.

BOTANICAL NEWS.

Dr. Alexander Braun lately published, in the Proceedings of the Berlin Academy, a paper on the *Isoëtes* collected last summer by Drs. Ascherson and Reinhardt, in the island of Sardinia, which he prefaces by some valuable general remarks and observations. The island of Sardinia and the adjacent islets are richer in *Isoëtes* than any other part of Europe, with the exception, perhaps, of Russia, as yet not sufficiently explored. Dr. Braun rejects the three genera (*Isoëtes*, *Cephaloceraton*, and *Isoëtella*), in which Genari divides the original genus, and proposes instead three natural groups, the aquatic, amphibious, and terrestrial *Isoëtes*, all distinguished by excellent characters.

Dr. Pringsheim, of Berlin, has been appointed Director of the Botanic Garden at Jena, in the place vacated by Professor Schleiden, and Dr. Areschoung has succeeded Dr. Elias Fries in the direction of the Upsala Garden, which the latter, it appears, resigned.

Professor Henkel, of Tübingen, is engaged on a monograph on Coniferæ.

Hanburia Mexicana, that singular Cucurbitacea, has recently been introduced by its first discoverer, Mr. Hugo Fink, of Cordoba, Mexico, and is now growing in the garden of the gentleman in whose honour the genus was named. The ovules prove to be erect, as correctly described in the original diagnosis.

Christian Frederick Lessing, a grandson of the great poet, and honourably known by his excellent papers on *Compositæ*, died, it appears, in Siberia in 1832. Nothing had been heard of him since 1835, when a paper of his on the flora of the Russian steppes appeared in the 'Linnæa.' Originally he went to Siberia for the purpose of botanical exploration, but he dabbled there in mining speculations, had bad luck, practised as a physician, and ultimately eked out an existence by turning brewer. A series of family misfortunes added to his misery, and made him prematurely old. Chamisso dedicated to him and the other two Lessings, the poet and the painter, the Composite genus *Lessingia*. There is another piece of Russian news, equally melancholy. In January last —exact date not given—died M. N. Turczaninoff, of Charkow, author of numerous papers in the Transactions of the Moscow Academy. The last years of his life he was suffering from a fall he had from a ladder when working in his herbarium. At one time occupying a high official position, he died in rather reduced circumstances, living on a small annuity from the Charkow University, to which body he had made over his herbarium. From Germany we hear of the death of the oldest professor of botany in that country, that of L. Ch. Treviranus, of Bonn, Foreign Member of the Linnæan Society of London, which took place on the 6th of May.

Pocket Microscopes for Sale.—Mr. Matthews, of Portugal Street, Lincoln's Inn, has constructed, for the use of students, a low-priced dissecting microscope, which, from its portability and general convenience, may be highly recommended as a serviceable pocket companion to botanists.

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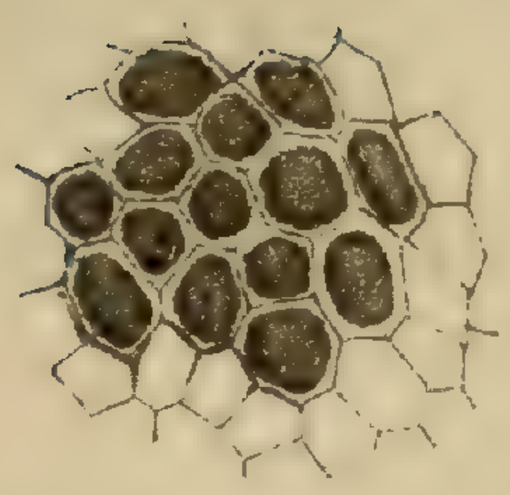

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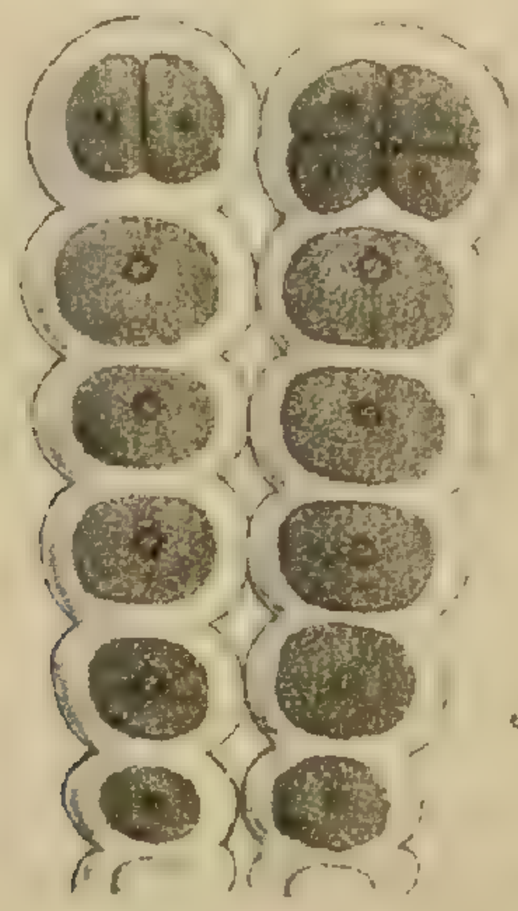

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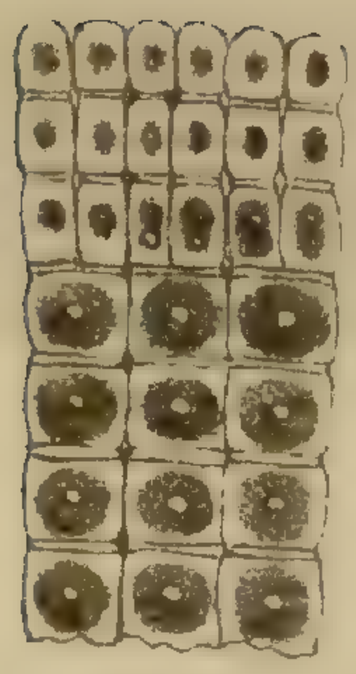

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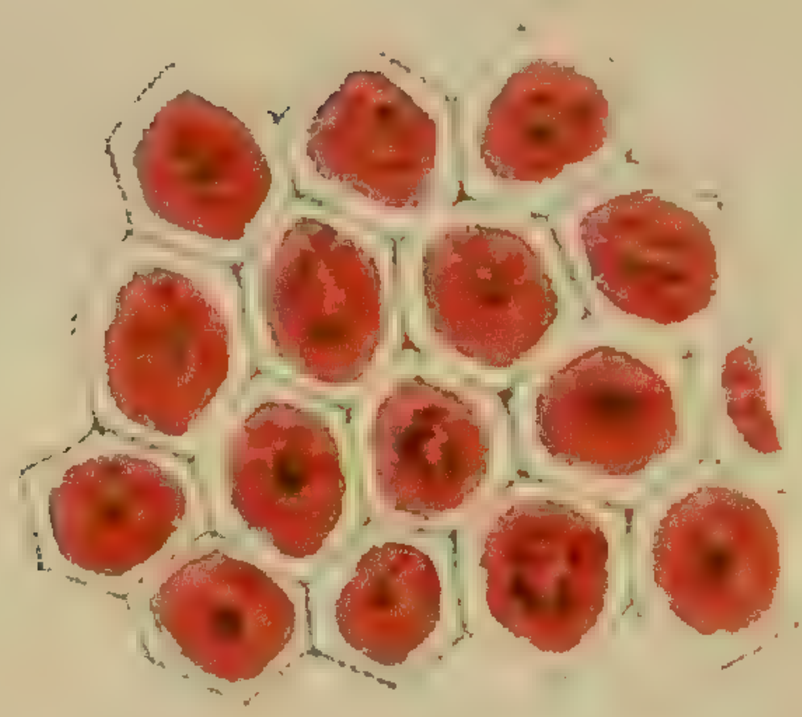

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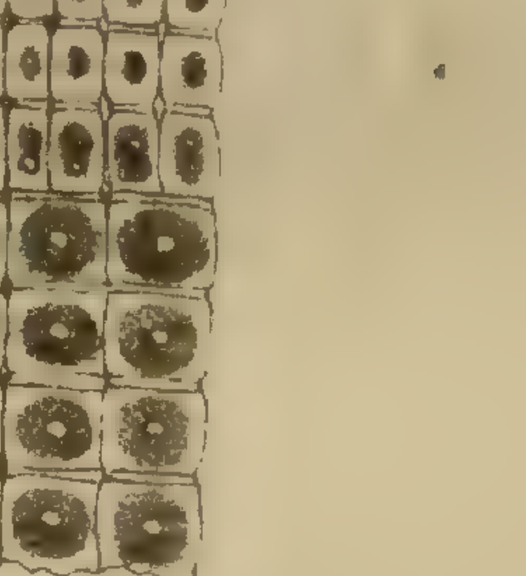

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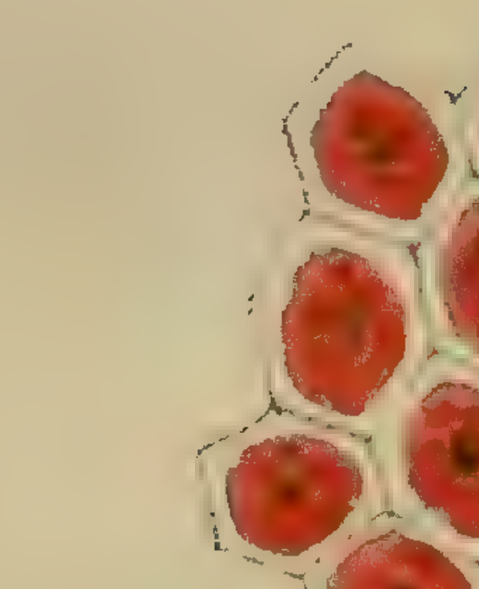

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9.

ON THE STRUCTURE OF *HILDENBRANDTIA FLUVIATILIS*, *Brebiss.*

By H. J. Carter, F.R.S., etc.

Communicated by Dr. Gray, F.R.S., of the British Museum.

(Plate XX.)

This Alga was found growing over flints in a little well about three feet in diameter and one foot deep, which encloses the spring or source of a freshwater rivulet at a place called "Tidwell," about a mile from Budleigh-Salterton, on the south coast of Devon. It consists of an extremely thin thalloid incrustation of a stale-blood or madder-brown colour, and of a layer of one, two, or more cells deep, extending over areas of two or three inches in diameter, and terminating in an undulating even edge. The surface-layer presents a tessellated appearance of polygonal cells (Fig. 5), arranged sometimes hexagonally, at others in lines more or less gyrating from a point, and each cell contains the colouring-matter, which gives to the whole expansion the deep-red tint above-mentioned. Besides this also, the surface presents a scabrous appearance (Fig. 1), produced by the presence of colourless or less coloured spots of a circular or curvilinear form, which remain separate or run into each other, having their centres raised, papillary, cracked by upward expansion, or excavated, showing, when broken up under the microscope, that they are composed of columns of cells, generally seven deep, with the uppermost one frequently divided into two or four daughter-cells (Fig. 3). Thus separated, too, all the cells of the columns are found to be equally colourless, nucleated, and in some instances void of contents, *i. e.* empty. Add to this, that on the surface of these light-coloured or papillary projections the cells are seen to be somewhat larger than those of the plane or thinner parts of the layer.

Thinking that the light-coloured circular spots would be found to contain elements of fructification like the conceptacles of *Hildenbrandtia sanguinea*, the common marine form, with which *H. fluviatilis* closely agrees in colour when fresh, I examined the scabrous patches or spots of the latter under the microscope, both *in situ* and broken up, but, instead of the paraphyses and thecæ common to *H. sanguinea*, I found nothing more than the columns of cells described; thus, *H. fluviatilis*,

if this should be the species noted by Kützing, "*Species Algarum*" (p. 695), and this be the form of fructification, differs altogether in the latter from Kützing's fructificating characteristics of the genus *Hildenbrandtia*.

The cells of the thalloid expansion generally are not more than $\frac{1}{2000}$th of an inch in diameter, and the layer itself so thin, hard, and firmly attached to the stone, that it requires to be scraped off under a magnifying glass with an almost equally thin and sharp knife for microscopic observation. I examined this Alga in February and May of this year (1864) with the same results, but do not consider my examination at all satisfactory, and therefore hope to resume it when I have more leisure than at the present time.

I have mentioned that some of the cells of the columns of the scabrous spots were empty, meaning that they thus presented the appearance of ovi-cells, from which the contents had escaped in the condition of zoospores. Again, the division of the upper cell in some columns into two or four daughter-cells is remarkable; but to state where the two elements of fructification, viz. sperm-cells and germ-cells, respectively come from is not, at present, in my power. So this is all for future observation to determine. The thalloid expansion is extremely thin; the cells of the layer throughout extremely minute; and the difficulty of bringing a piece of the layer *in situ* under a high microscopic power for good observation, on account of the opacity of the flint on which it grows, so great, that as yet I have by no means, as before stated, examined the structure of this Alga satisfactorily.

On going to the rocks on the seaside for a portion of *H. sanguinea* for comparison, I found *it also* growing on *flints only*. I have found neither species yet growing on the sandstone pebbles. Both, from the extreme thinness and delicacy of their structure respectively, appear to prefer the surface of flints, probably for its smoothness.

I have not found *H. fluviatilis* in any other place in the neighbourhood of that mentioned.

Kützing, if I am right in identifying the species found at Tidwell with his *H. fluviatilis*, makes it a variety of his *H. rosea*, a marine species, p. 694, *op. cit.*; but, as before observed, if it bears no conceptacles such as those by which he characterizes the genus *Hildenbrandtia*,—then it can hardly be considered a species of this genus.

The colour fades somewhat by drying and keeping, as clearly seen by one of the specimens, which was taken last February.

Subsequent Observations.—On examining the little light-coloured papillæ on *Hildenbrandtia fluviatilis* again, I can come to no other conclusion than that they are the conceptacles, for, besides differing slightly in structure from the rest of the thalloid expansion, there is nothing else on it that I can see to represent the fructification of the species but these papillæ.

The conceptacle, then, in *Hildenbrandtia fluviatilis* rises on the dark-red layer of cells, which forms the thallus as a pimple of a lighter colour than the thallus, and losing almost all its redness as it increases in size, at length arrives at about $\frac{1}{300}$th of an inch in diameter (Fig. 6). In form it may be circular, oval, or irregularly curvilinear in outline. The summit then opens, and the columns of cells of which the crust is composed fall back so as to give a crateriform hollow with sloping sides (Fig. 7). Cracks then extend outwards from this cavity, and as the latter enlarges so the columnar structure falls away (Fig. 8), until it is diminished to a little white border, which forms the line of demarcation between the red thallus and the enlarged crateriform hollow within, now occupying nearly the whole of the base of the original papilla (Fig. 9). It is the running together of these papillæ, and the subsequent desquamation just mentioned, which gives the scabrous appearance to the thallus above described.

The columns, which I have figured, are composed of 6–10 cells, piled one upon another, and a single or crucial division frequently extends downwards from the surface to the third cell inclusively, which thus diminishes the size of the cells, and multiplies the number of columns peripherally (Fig. 4). Each cell, large and small, presents a nucleus, and the other cell-contents lose their red colour in proportion as the columns are distant from the base of the papilla or conceptacle.

I also observed this time that there appeared to be a layer or group of cells still a little larger than those of the columns, forming the bottom of the, so to write, crateriform cavity, whose contents respectively, void of red colour, but tinted a little yellowish, bore a very circumscribed, spore-like appearance (Fig. 2), while in both among the cells of this group and among those of the columns, there were several empty ones. Had the contents of these left them in the form of fructifying elements?

On crushing the conceptacles under the microscope, a few zoospores made their appearance, of the colour of the contents of the supposed

fructifying cells, but they were too small and too rapid in their movements to be followed successfully with the microscope.

In conclusion, then, may we not infer, if the columnar structure does not represent the antheridia, and the group of cells at the bottom of the conceptacle the female spores, at least that these papillæ contain the fructifying organs of *Hildenbrandtia fluviatilis*, in some form or another?

Explanation of Plate XX.

Fig. 1. *Hildenbrandtia fluviatilis*, Breb.? with the scabrous appearance of the fructiferous (?) spots: *greatly magnified*. Fig. 2. Cells of the bottom of the cavity of conceptacle. Fig. 3. The columns of cells of the scabrous spots. Fig. 4. The same, with three of the upper cells divided. Fig. 5. The cells of the thallus: *greatly magnified*. Fig. 6–9. The conceptacle in its different stages from its early or closed to its deciduous state.

NEOTINEA INTACTA, Reichb., A RECENT ADDITION TO THE BRITISH FLORA.

By D. Moore, Ph.D., F.L.S.

On the 27th of June I had the pleasure of submitting to the Royal Irish Academy *Neotinea intacta*, Reichb., an Orchid new to the British flora. This pretty little plant, hitherto only known from Greece, Malta, Madeira, Algiers, south of Germany, and Portugal, was discovered by Miss More, the sister of that eminent British botanist Mr. A. G. More. She found it early in May, growing in calcareous pastures, at Castle Taylor, county of Galway, Ireland. After making myself pretty certain of the species, I sent a specimen to Professor Reichenbach, of Hamburg, and in a letter dated June 20, he informs me that the new Irish Orchid "is indeed *Neotinea intacta*." An excellent figure of the wild plant will be found in Reichenbach's Icones Flor. Germanicæ, vol. 13–14, t. 500; and a cultivated specimen is figured by Lindley in the 'Botanical Register,' t. 1525, under the name of *Aceras secundiflora*. In the dry state the plant looks very much like *Habenaria albida*, and it would be well worth while to inquire whether it has ever been passed over elsewhere as that species.

Miss More may be justly proud of her discovery, one of the most important made for many years. It is a highly interesting addition. It is well known that in the south-western counties of Ireland several

plants typical of the Asturian flora, and of the flora of North America, occur, not found elsewhere in the British Isles. They seem to form the solitary outlying posts of the geographical distribution of the plants belonging to those floras. In Cork the interesting *Neottia gemmipara*, Smith, *Spiranthes cernua*, Reichb., grows, which at one time was considered to be confined to Ireland, but has since been found to be a North American species. Again, in the county of Galway, that pretty little aquatic, *Naias flexilis*, another plant of the North American flora, occurs. In Kerry several of the *Saxifrageæ* of the Pyrenees appear, and also several of the Pyrenean Ericaceous plants extend from Kerry through Galway to Mayo, but stop there, as they are not found further to the east, south, or north of this island.

Glasnevin, July 1, 1864.

[The specimen sent with this notice has been figured by Mr. Fitch for the 'Journal of Botany,' and, at the request of Mr. A. G. More, been presented to the British Museum.—Ed.]

REMARKS ON SOME DIOICIOUS PLANTS.

By W. G. Smith, Esq.

(*Read before the Society of Amateur Botanists.*)

Of late years, various hypotheses have been started, both in this country and on the Continent, which, though more or less borne out by experiment, are on the whole so thoroughly opposed to all former experience, that believers in them have been but few. I allude in particular to spontaneous generation, to the power possessed by Rotifers and some other animals to *survive* drying, baking in ovens at a great heat, saturation in powerful acids, etc., and on the application of some restorative to become once more full of life and instinct; and to the so-called parthenogenesis, or the possibility of certain female plants and animals possessing the power of fertilizing their own ovules and ovums without the action of the male principle.

It is principally on the latter that I propose making a few remarks, and recording some of my own observations.

In *Bryonia dioica*, and probably all other dioicious plants, I think we may start with the assumption that when the ovules have been fertilized

apart from contact with the pollen of the male, a fertilizing influence has been at work in some form or manner. I think an exaggerated importance is attached to the functions of various organs. For instance, although anthers generally bear the pollen, under certain conditions other organs will produce pollen. Instances of this are on record. I have near me a drawing, copied by myself from nature, showing the pistil bearing an anther as well as a stigma (in "*Crocus vernus*"); on the end of this anther again is another small stigmatic surface. It is also well known that petals occasionally bear anthers, generally situated in their thickest part, as in *Nymphæa alba*, and in the double forms of the garden Poppy. I have frequently seen the middle of the petal of a double Poppy open and discharge pollen, showing the close affinity of all the organs of the flower. Instead then of jumping to the conclusion that a female flower is able to fertilize itself without pollen, it would be well, in all dioicious flowers, to see if the pistil or petals are ever capable of producing or do produce pollen; or if abortive forms of the stamens occur, that on occasion may produce pollen so as to fertilize the ovules when the male flowers are absent.

In my mind it is an open question as to whether a female flower cannot be fertilized without the direct influence of true pollen. If anything will do this, I am inclined to think it is the nectar found at the base of the petal; this is probably the nearest ally to the true pollen, and in some *Ranunculaceæ* I have observed the nectary bearing pollen in the place of nectar. In some female flowers that bear this nectar-like secretion, is it not probable that on certain occasions the nectary may play the part of the anther of the male? Or may not pollen be at times produced from a petal on its hastening forward to the next stage of flower growth, a stamen?

It has been stated rather positively that the female flowers of *Bryonia* and other plants have no traces of stamens or anthers. M. Naudin, of Paris, in his valuable and highly interesting paper "On the Formation of Seeds without Pollen" ('Comptes Rendus,' 1856, p. 538, and republished by Dr. Seemann in 'Hooker's Journal of Botany and Kew Miscellany' for 1857, ix. p. 53), has the following passage:—

"In 1854, I observed in ground close to a wall and palisades, belonging to the Museum, a female plant of the common Bryony (*Bryonia dioica*), quite alone in this ground, and which, from thousands of flowers which it had produced, had set and ripened fruit in very great numbers, but in a proportion in-

comparably less than that of the flowers. These fruits contained well-formed seeds. In November of the same year I had fifteen of them sown in a hot-house; all came up very well. In 1855 this female Bryony fructified as it did in the preceding year, and in the same proportion as it had done in 1856. I have examined the flowers many times, and have never found in them any traces of anthers. We may then suppose that some fruits which it produced each year proceeded from fecundations effected by the intervention of insects. What follows will prove that this reason cannot be advanced.

"In April of this year I caused to be planted, in the same border where the Bryony was found, a second female specimen, raised from seeds produced in November, 1854, and which, till then, had remained potted. Doubtless on account of its youth this plant did not develope much, but it was covered with flowers, which, without exaggerating, I may reckon at many thousands. All were females; in some I perceived not the slightest vestige of anthers, and yet, remarkable to say, all, or almost all, produced fruit now ripe, which gave to the withered branches of the plant the appearance of long red bunches. I took a hundred of them promiscuously, to examine their contents; of this number there was a dozen containing no seeds at all, forty-five with only one, twenty-nine two, eleven three; there were only two with four seeds, and one alone which contained five. This result does not sensibly differ from that presented by the plant which grew close to a male plant.

"Yet while this second Bryony was literally covered with fruit, the old plant, distant from it only a few yards, bore neither more nor less fruit than it did in the preceding years. We cannot say then that in both fecundation may have been effected by insects carrying pollen of the species, since it is evident that they would have equally taken it to both, and that both in consequence would have equally borne fruit. Now, as I have just said, the difference in this respect was enormous. I can only explain it to myself by the particular individual dispositions; in other terms, by veritable idiosyncrasies."

At the base of the petals of the female flower of *Bryonia dioica* may be seen a sort of globular gland surrounded by hairs. This would seem to answer to the anther of the male. It is very rarely if ever absent, and sometimes takes a slight twist, like the normal anthers. It is a very minute object generally. I have had some difficulties in carrying out my experiments on this plant, but may mention one that is decisive. I gathered, several times, branches of the female plant with the flowers in bud, and kept them in water under a propagating-glass till they opened. When examined, one or two grains of pollen were found in nearly every flower, probably produced by these gland-like bodies to which they were attached. The ovaries of most of the flowers became swollen, but eventually dropped off. One peculiarity of the plant is, that the opposite sexes are generally found in groups,

and the two sexes very rarely *together*. I have *once* seen a male and female stem growing close together, but could not ascertain whether or not they were thrown out from the same rootstock, although I think it probable; for, judging from the natures of other plants, there is no reason to believe that the *rootstock* is male or female, but that it is capable of throwing up either a male or female stem at different times, as circumstances or the nature of the plant may direct. I know this to be the case in another instance.

I may however say, that in various berries of the Bryony I have planted in my own garden, all the seeds contained in each separate berry produced plants of one sex, for a single berry does not appear to contain seeds capable of producing plants of both sexes the first year. This sufficiently accounts for the *groups* of male or female plants usually seen in the hedges.* Should a bird, for instance, drop a berry in any locality, it would produce a group of males, or a group of females, although I am inclined to think a male plant one year may become a female plant another year. But in *Bryonia*, contrary to my experience in other dioicious plants, I have never found occasional male flowers on a female plant, or occasional female flowers on a male plant. It is common to find a female plant or a group of females (with no male anywhere near), with all the seeds fertilized and covered with ripe berries. In some female plants growing in my neighbourhood, and removed a considerable distance from all males I have seen nearly every flower fertilized, and when the female flowers were examined, I found their interiors profusely covered with pollen, evidently brought from male plants by insects, as every one who has noticed *Bryonia* must have observed what a profuse quantity of pollen their anthers shed.

I will now turn to *Lychnis diurna*, or *dioica rubra*. I am not aware that the female form of this plant is said to be able to fertilize itself, but to a superficial observer it might well be supposed to do so. From my own experiments I well know individual specimens of this plant to be sometimes *entirely male*, then monœcious, and eventually *entirely* female. I have a plant in my garden, the rootstock of which has produced all three since the early spring of this year. When first planted, it threw up stems containing *male flowers only*. This con-

* I think *seeds* themselves are probably not either male or female, but that *after influences* produce the sex; as in animals the sex is not developed in the early embryo life of the creature, nor till the embryo has attained a certain age.

tinued for a month, when females began to appear; but it is clear, that if all the males had died off before the females were produced, no seed could be brought into existence; on the contrary, when all the males had died and dropped away, and *females only* were on the plant, all the ovules were *fertilized* without exception. How was this effected? Was parthenogenesis at work here? Not so; the original males, long since dead, caused the fertilization. But how, if the males were dying off when the females were only in bud? By this simple contrivance of Nature:—When the male flowers had attained maturity, and were shedding their pollen, the female buds appeared below, *with their stigmas hanging* out of the buds, so that there was a very good chance of all the females being fertilized, although only in bud. Nor was this all, for I believe in this plant, as in nearly all others, insects are designed to play their parts. At first sight, it is not clear how insects could help this plant, but I will explain. In the first place, the crimson colour of the petals of the male flower must be attractive to insects. Suppose an insect has got the pollen from the male on to his head, legs, etc., and the crimson petals of the female have not yet appeared, what is there to attract him in turn to the *female?* Simply this; whilst the male has got a calyx barely marked with red lines, the calyx of the female bud is *much more crimson* and attractive; so that, whilst an insect is attracted by the crimson of the *petals* of the male, it is in turn attracted by the crimson of the *calyx* of the female, and if the insect alights at all he must go at once on to the stigmas, and so Nature's object is effected.

When one observes in the vegetable kingdom the various forms of plants, some dioicious, some partially so, some hermaphrodite, and others seldom or only under peculiar circumstances ripening their fruit, the question suggests itself as to whether all plants are not gradually changing from one state to another. I am borne out in this hypothesis by Mr. Darwin, who remarks that *Primula* is probably gradually becoming dioicious from the hermaphrodite condition. Or, whilst one set of organs are being suppressed, the complementary set are being more fully developed. I believe this to be probable, and supported by many facts in both the animal and vegetable kingdoms. If we take the animal kingdom, we find a limited number of creatures unquestionably hermaphrodite, but of a very low order; but if we call all the creatures possessing separate sexes dioicious, we then come at once to a

much higher order of being. I believe it is the same in the vegetable kingdom, for where the sexes are separated there must be more difficulty in breeding, the act of fertilization depending upon external, or perhaps accidental circumstances. The lower any object is in the scale of nature, either animal or vegetable, the more profusely it multiplies itself; whilst the higher, the greater difficulty there is in breeding. Take horses, for example. Every one knows the difficulty there is of increasing the number of highly-trained animals. Even in man, as a rule, the lowest and most debased races increase most rapidly. The higher order of animals produce one at a birth, the lower hundreds or thousands. The same applies to vegetable life; the lower the plants the more profuse the breeding, as in the toadstool, with its millions of spores; and in the opposite degree those flowering plants are the highest that produce the least number of seeds, or that have the greatest difficulty in propagating themselves.

But the argument cannot stop here, and I may be allowed to carry it to its extreme consequences. If all living things are gradually casting off the hermaphrodite condition for one of a single sex to each, what reason is there for supposing that this is anything more than a single step in one complete design, and that the next is the obliteration of sexuality altogether! If at one step we move from the object that breeds millions to the creature that only produces one at a birth, the next step where reproduction by sexuality ceases altogether is comparatively easy. It is clear that the less things are able to increase, the less necessity there is for death, as one set of beings have not to perish to make room for another. It is well known to gardeners that the life of a plant may be prolonged, and its nature strengthened and improved, by not allowing it to exhaust itself in producing seeds. Will not the same apply to all nature? Will not, by the gradual obliteration of all sexuality, races of plants and animals be gradually improved, till some point is reached when the necessity for reproduction entirely ceases, and the change of form called death become unnecessary?

REVISION OF THE NATURAL ORDER *HEDERACEÆ*.

By Berthold Seemann, Ph.D., F.L.S.

Under this heading I propose publishing a series of papers on all Umbelliferous plants having valvate petals and a fruit composed of two or more carpels, of which *Hedera Helix* is the type; all genera with imbricate petals and 1-celled ovaries being excluded, as elements foreign to this group.

Linnæus has bequeathed us only one genus of *Hederaceæ* (*Hedera*); his genera *Panax* and *Aralia*, reduced to their original limits, are not members of the Order.

In 1756, P. Browne published the genus *Sciadophyllum;* ten years later (1766), Forster, *Schefflera*, *Polyscias*, and *Meryta*. In 1780, Thumberg established the genus *Cussonia*, and in 1789, Commerson that of *Gastonia*. In 1791, Gærtner added *Heptapleurum;* in 1802, Ruiz and Pavon, *Gilibertia* and *Actinophyllum;* and in 1806, Petit-Thouars, *Maralia*. During the twenty-four years which followed, no additions were made to this list.

In 1830, De Candolle enumerated thirteen genera, viz. *Adoxa*, *Panax*, *Cussonia*, *Maralia*, *Gilibertia*, *Gastonia*, *Polyscias*, *Toricellia*, *Aralia*, *Sciadophyllum*, *Hedera*, *Paratropia*, and *Arthrophyllum*. Four of these (*Adoxa*, *Panax*, *Aralia*, and *Arthrophyllum*) being excluded by the definition above given, the genera known to De Candolle are reduced to nine. Only one of the genera published as new on this occasion (*Toricellia*), was not previously known.

In 1840 Endlicher, in his 'Genera Plantarum' (including the first supplement), enumerated sixteen genera, adding to those known to De Candolle *Botryodendron*, *Miquelia*, and *Brassaia*. But *Miquelia* belongs to *Olacineæ*, so that we obtain only two additions, or rather one, for *Botryodendron* had been previously described by Forster under the name of *Meryta*, as I have shown in 'Bonplandia' for 1862, p. 294.

In 1854 Asa Gray (Botany of Wilkes's Expedition) added to our list *Reynoldsia*, *Tetraplasandra*, and *Plerandra*,—all three excellent genera.

In the same year (1854) Decaisne and Planchon commenced, in the 'Revue Horticole,' a revision of the Order "*Araliaceæ*," which unfortu-

nately has never been completed, only nineteen genera being treated upon. It is merely a sketch, written for a gardening paper, but nevertheless the most important ever brought out on the subject. The learned authors there pointed out the importance of the articulation of the pedicels, the calyculus, the æstivation, and the albumen. The new genera indicated were found, in most instances, to be so natural, and coincide so well with the geographical distribution, that most of them have been generally adopted, though they have, as yet, not been described. They were eight in number (viz. *Stylbocarpa*, *Echinopanax*, *Fatsia*, *Brassaiopsis*, *Dendropanax*, *Oreopanax*, *Didymopanax*, and *Cuphocarpus*), two of which, *Cuphocarpus*, with its unicellular ovary, and *Stylbocarpa*, on account of its quincuncial petals, must be excluded from the Order.

In 1856, Miquel published in the 'Bonplandia' a paper on the *Araliaceæ* of the Indian Archipelago, in which he establishes five new genera (viz. *Agalma*, *Eupteron*, *Aralidium*, *Macropanax*, and *Nothopanax*); and in a subsequent, though antedated publication, his 'Flora of Dutch India,' and its supplement, he adds to them *Actinomorphe* and *Parapanax*. Of these *Aralidium*, with its 1-celled ovary, will have to be transferred to *Cornaceæ*. In the same year (1856) Hooker fil. and Thomson established the genus *Tupidanthus;* in 1858, Grisebach, (Bonplandia) the genus *Sciadodendron;* and in 1859, Maximowicz, the genus *Eleutherococcus*.

In 1859, Carl Koch gave, in his 'Wochenschrift für Gärtnerei und Pflanzenkunde,' an enumeration of the garden *Araliaceæ* known to him, and a review of the labours of those gone before him in this field of inquiry. Though overlooking a few, he enumerates thirty-four genera, of which seven (*Aralidium*, *Arthrophyllum*, *Cuphocarpus*, *Panax*, *Aralia*, *Pukateria*, and *Bursinopetalum*) are not recognized by me as *Hederaceæ*. He proposes two new genera (*Pseudopanax* and *Tetrapanax*).

In 1863 I pointed out, in the 'Journal of Botany,' that *Horsfieldia*, *Hydrocotyle*, and several other genera hitherto placed in *Umbelliferæ* must be referred to *Hederaceæ*, on account of their truly valvate petals; and in 1864 I added *Crithmum* to the list.

In the following papers I shall review the genera in such groups as may be best calculated to show their respective limits, illustrating them xylographically by magnified figures. When the whole Order

has been worked up, I will give a proper systematic arrangement of them. At present there is not even a complete list of the genera.

I. On the Polyandrous Genera.

In the 'Botanical Magazine' for April, 1856, there is published, on plate 4908, a new genus of *Hederaceæ*, *Tupidanthus calyptratus*, Hook. fil. et Thoms., of which it is remarked, that "the coalescence of the calyx lobes and corolla into an arched coriaceous calyptra, together with the numerous stamens, the total absence of styles, and very numerous cells of the ovary, are perhaps unique in the Order" to which it belongs. The characters are certainly very singular, but it had evidently been overlooked that two years previously (in 1854) Asa Gray described two allied genera from the South Sea Islands (*Plerandra* and *Tetraplasandra*), both of which share with *Tupidanthus* a calyptrate corolla, polyandrous stamens, and a many-celled ovary. The calyptrate corolla had previously been noticed in some of the older genera of the Order, but the polyandrous stamens were certainly quite a new feature,—no more 13 than had been known to exist amongst this group of plants. During my exploration of the Viti Islands, I was fortunate enough to discover several additions to the polyandrous *Hederaceæ*, among them two entirely new genera (*Nesopanax* and *Bakeria*), and in the following pages I propose to give a description of them, together with an enumeration of all the polyandrous *Hederaceæ* known to me. In this list a polyandrous genus will be missed, which being referred by Bentham and Hooker fil. (Gen. Plant. p. 17) to *Hederaceæ*,—"est Araliacea anomala ovario subsupero" are their exact words,—would naturally be looked for in this place. I mean *Trochodendron*, a Japan genus founded by Siebold and Zuccarini, and placed by them amongst *Wintereæ*, by Endlicher as an anomalous genus at the end of *Magnoliaceæ*, and by Miers in the neighbourhood of Ternstrœmiaceæ. However it cannot be admitted amongst *Hederaceæ*, differing as it does from all the known members of the Order by its 4-celled anthers and many-ovuled ovaries, to say nothing of its entire want of calyx *and* corolla. Its affinities are, in my opinion, much more with *Wintereæ*, the very group in which Siebold and Zuccarini placed it; and its nearest ally I hold to be *Euptelia*, Sieb. and Zucc., the nature of which has become better understood by the recent publication of Drs. Hooker and Thomson's new Indian species ('Linnean Journal,' sect. Botany, vii. 241. t. 2),

in which it is convincingly shown that the best place to be found for that genus is with or near *Wintereæ*. This is exactly the position in which *Trochodendron* has been put by its founders. The two genera agree in almost all essential points, viz. their arboreous habit, alternate, serrate simple and exstipulate leaves, peculiar process of budding, apetalous flowers, numerous stamens, 4-celled anthers, many-ovuled carpels (at least in two out of the three known species), anatropous ovules, albuminous seed, and minute embryo; but they differ in the carpels being separate in *Euptelia*, and almost consolidated in *Trochodendron*. How far this would affect their being grouped together is a matter of individual opinion. In *Ranunculaceæ* we have genera with free, and more or less consolidated carpels, and in *Papaveraceæ* a species, the common garden Poppy, one variety of which* has distinct and consolidated carpels in the same flower. I incline to think that we have here the first known members of a new Order of plants which will have to be ranged near *Ranunculaceæ* and *Magnoliaceæ*, and which might be called *Trochodendreæ*.

The two genera I have to propose (*Bakeria* and *Nesopanax*) present a new feature, combining as they do free petals with an indefinite number of stamens, the other polyandrous genera previously known having calyptrate petals.

CONSPECTUS GENERUM HEDERACEARUM POLYANDRARUM.

* *Petala calyptratim cohærentia, caduca.*

1. *Tupidanthus.* Pedicelli inarticulati. Flores ecalyculati. Petala 5. Stamina indefinita, biserialia. Ovarium multiloculare. Stigma depressum, 3–4-crure.—Arbor Indiæ orientalis, exstipulata, foliis digitatim 8–9-foliolatis, umbellis compositis.

2. *Tetraplasandra.* Pedicelli inarticulati. Flores ecalyculati. Petala 7–8. Stamina 28–32, uniserialia. Ovarium 7–10-loculare. Stigma obsolete 7–10-radiatum, stylopodio brevi impositum.—Arbor Hawaiiensis, exstipulata, foliis pinnatim 5–7-foliolatis, umbellis paniculatis.

3. *Plerandra.* Pedicelli inarticulati. Flores ecalyculati. Petala 5. Stamina indefinita, pluriserialia. Ovarium 14–15-loculare. Stigma truncatum, obsolete multiradiatum, stylopodio conico impositum.—Arbores Vitienses, exstipulatæ, foliis digitatim 9-foliolatis, umbellis compositis.

* See figure in Gard. Chronicle for 1859, and 'Bonplandia,' 1859, p. 336.

4. *Brassaia*. Pedicelli nulli. Flores calyculati. Petala 7–17, vulgo 12. Stamina 7–17, plerumque 12, uniserialia. Ovarium 7–17, vulgo 12-loculare. Stigma obsolete 7–17-radiatum, stylopodio conico impositum.—Arbores Novæ Hollandiæ, Novæ Guineæ, et Sumatræ, stipulatæ, foliis digitatim 9–16-foliolatis, capitulis racemosis, pedicellis basi bracteatis.

5. *Reynoldsia*. Pedicelli inarticulati. Flores ecalyculati. Petala 8–10. Stamina 8–18, uniserialia. Ovarium 8–18-loculare. Stigma 8–18-radiatum, stylopodio conico impositum. — Arbores insularum Oceani Pacifici, exstipulatæ, foliis pinnatim 3–9-foliolatis, umbellis paniculatis compositis, pedicellis nudis.

** *Petala basi cohærentia, persistentia.*

6. *Gastonia*. Pedicelli inarticulati. Flores ecalyculati. Petala 10–11. Stamina petalorum numero, uniserialia. Ovarium 8–10-loculare. Styli 8–10, distincti.—Arbor Mauritiana, foliis exstipulatis imparipinnatis, umbellis paniculatis.

7. *Grotefendia*. Pedicelli articulati. Flores calyculati. Petala 11–13. Stamina petalorum numero, uniserialia. Ovarium 5–10-loculare. Styli 5–10, distincti.—Arbores Mauritianæ, foliis exstipulatis imparipinnatis, floribus racemosis v. umbellatis.

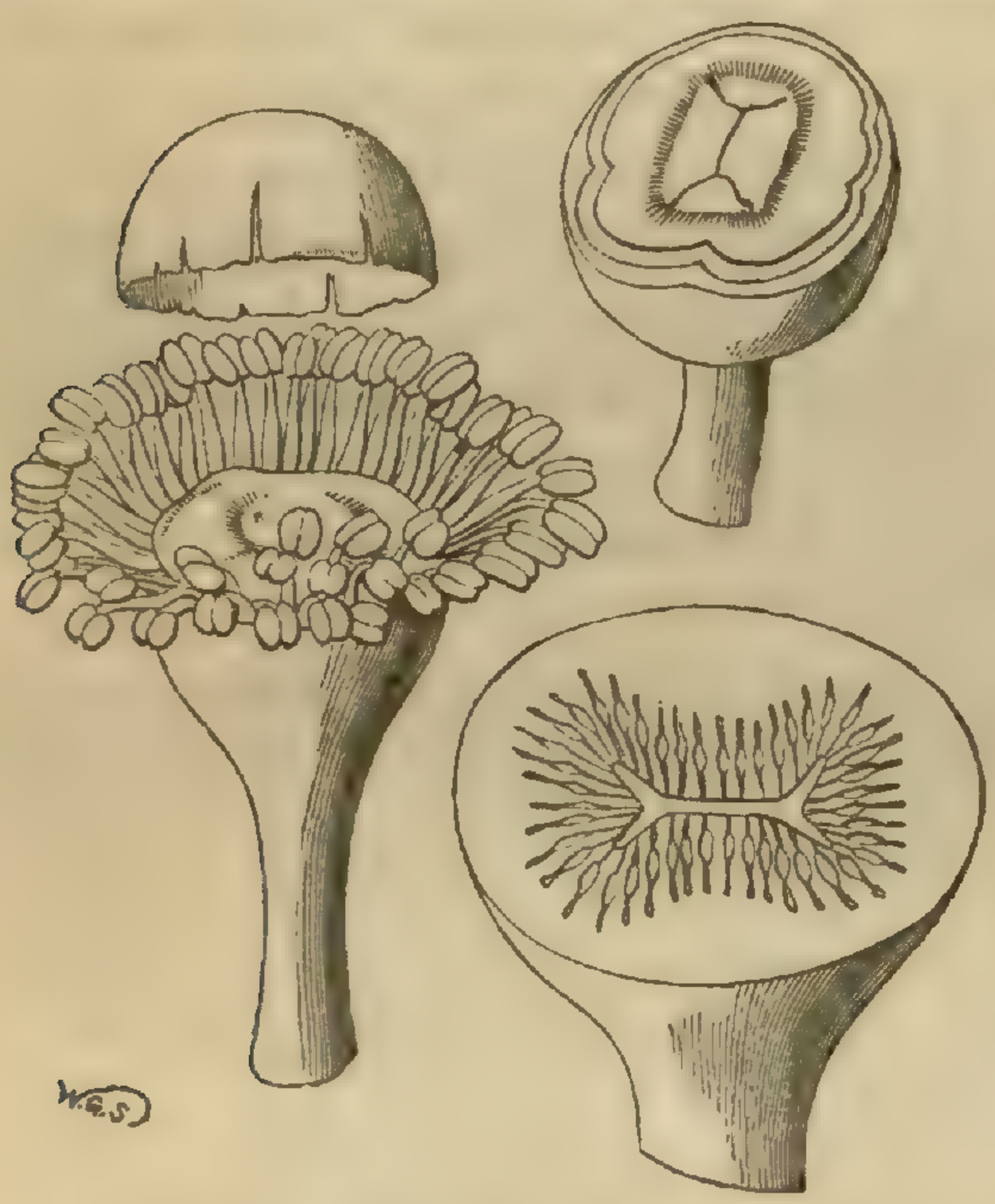
*** *Petala libera, persistentia.*

8. *Bakeria*. Pedicelli inarticulati. Flores ecalyculati. Petala 5. Stamina 15, uniserialia. Ovarium 5-loculare. Stigma obscure 5-fidum, stylopodio subconico impositum.—Arbor Vitiensis, foliis digitatim 5-foliolatis, petiolis basi stipulatim dilatatis, umbellis compositis.

9. *Nesopanax*. Pedicelli inarticulati. Flores ecalyculati. Petala 5. Stamina indefinita, pluriserialia. Ovarium 5–7-loculare. Styli 5–7, distincti, breves.—Arbor Vitiensis, foliis digitatim 7–9-foliolatis, petiolis basi stipulatim dilatatis, umbellis compositis.

I. Tupidanthus, Hook. fil. et Thoms. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calyx tubo late clavato v. hemisphærico, limbo truncato. Petala 5, calyptratim cohærentia ("corolla monopetala," C. Koch). Stamina indefinita, biserialia; antheræ oblongæ, 2-loculares. Ovarium multiloculare, centro depressum et rima stigmatifera 4- v. 3-cruri insculptum, loculis uniovulatis. Bacca coriacea, multilocularis, loculis 1-spermis.—Arbor Indiæ orientalis, foliis exstipulatis digitatim 8–9-foliolatis, foliolis petiolulatis oblongis acu-

minatis, integerrimis, glaberrimis, umbellis compositis, lateralibus, corollis viridibus, staminibus pallide stramineis. — *Tupidanthus*, Hook. fil. et Thoms. in Bot. Mag. t. 4908 (1856); C. Koch, Wochenschrift, 1859, p. 348.



Tupidanthus calyptratus (*partly after Hooker*).

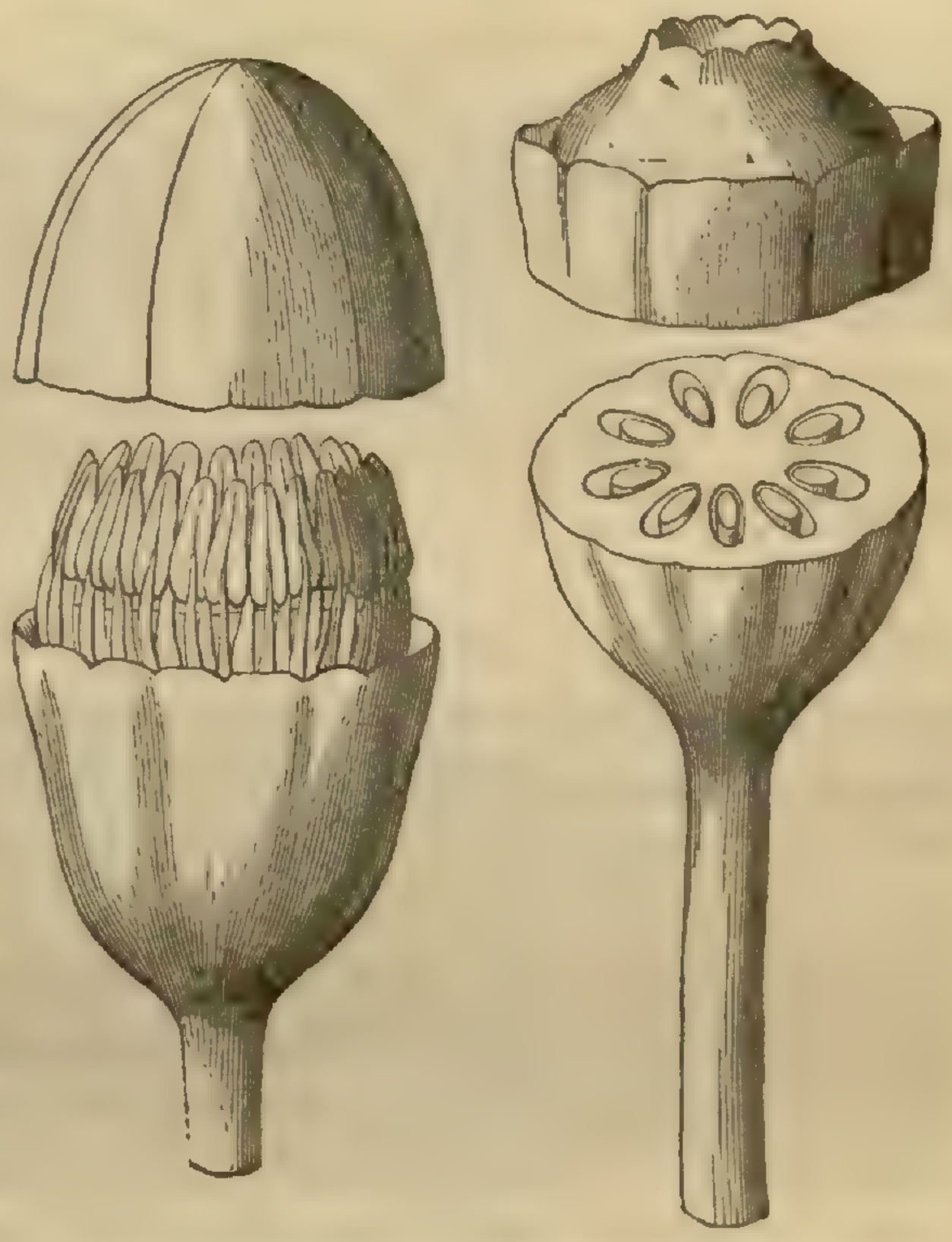
1. *T. calyptratus*, Hook. fil. et Thoms. in Bot. Mag. t. 4908. *T. Pückleri*, C. Koch, in Wochenschrift, 1859, p. 348, cum icon. *Sciadophyllum pulchellum*, Hort.—At the base of the Khasia Mountains, Eastern Bengal (Hooker fil. and Thomson! Griffith! n. 2701).

This tree seems to grow as underwood and support its weak stem by leaning against other trees, as many other *Hederaceæ* do, a habit which the founders of the genus expressed by "*Arbor alte scandens.*" Dr. Carl Koch, mistaking "*scandens*" for "*cirrhosus*" ("*rankend*" is his exact translation), has endeavoured to make a second species (*T. Pückleri*), which he says differs from *T. calyptratus* by not being cirrhose. Of course *T. Pückleri* must fall to the ground. The Kew plant, from which the figure in Bot. Mag. t. 4908 was made, is now 24 feet high, and erect, in growth very much the same as all the other garden plants of this species are.

II. TETRAPLASANDRA, A. Gray. Pedicelli inarticulati. Flores ecalyculati, polygami (?). Calyx tubo hemisphærico, limbo brevissimo truncato vix denticulato. Petala linearia, 7–8, calyptratim cohærentia. Stamina petalorum numero 4-plo (28 v. 32), uniserialia; antheræ oblongæ, subsagittatæ. Ovarium 7–10-loculare. Stigma obsolete 7–10-radiatum, stylopodio brevi conico impositum, loculis 1-ovulatis. Drupa baccata, 8–10-pyrena, pyrenis coriaceis.—Arbor Hawaiiensis, procera, inermis, foliis exstipulatis pinnatim 5–7-foliolatis, foliolis oblongis v. ellipticis utrinque obtusis v. apice acutis integerrimis, subtus incanis,

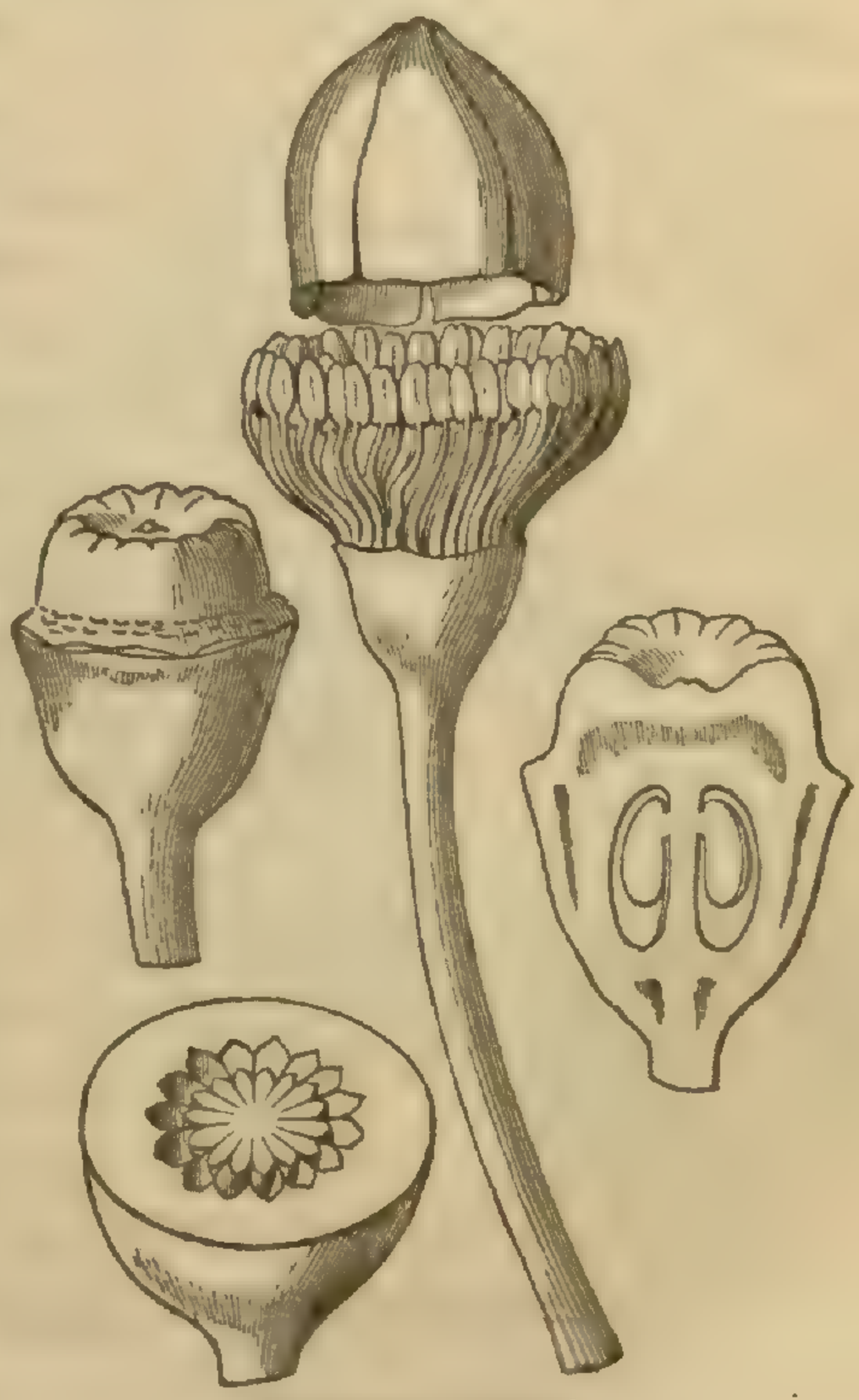
umbellis paniculatis. — *Tetraplasandra*, A. Gray, Bot. Wilkes, p. 727, t. 94 (1854). Walp. Ann. v. p. 82.

1. *T. Hawaiensis*, A. Gray, Bot. Wilkes, p. 728, t. 94; Walp. Ann. v. p. 82.—Hawaii, Sandwich Islands, in the district of Puna (United States Expl. Exped.).



Tetraplasandra Hawaiensis (*after Asa Gray*).

III. PLERANDRA, A. Gray. Pedicelli inarticulati. Flores ecalyculati, polygami. Calyx tubo turbinato, limbo brevissimo post anthesin repando-undulato. Petala ovato-triangularia, 5, calyptratim cohærentia. Stamina indefinita, pluriserialia; antheræ oblongæ. Ovarium 12–15-loculare, loculis 1-ovulatis. Stigma truncatum v. depressum, obsolete multiradiatum, stylopodio conico impositum. Drupa obovata, 12–15-loculare, loculis 1-spermis. — Arbores Vitienses, inermes, foliis exstipulatis digitatim 9-foliolatis, foliolis obovato-oblongis integerrimis, umbellis compositis. — *Plerandra*, A. Gray, Bot. Wilkes, p. 729, t. 95 (1854); Walp. Ann. v. 81.



Plerandra Grayi.

Asa Gray not having had sufficient materials, I have emendated the generic character of *Plerandra*. The petals are 5,

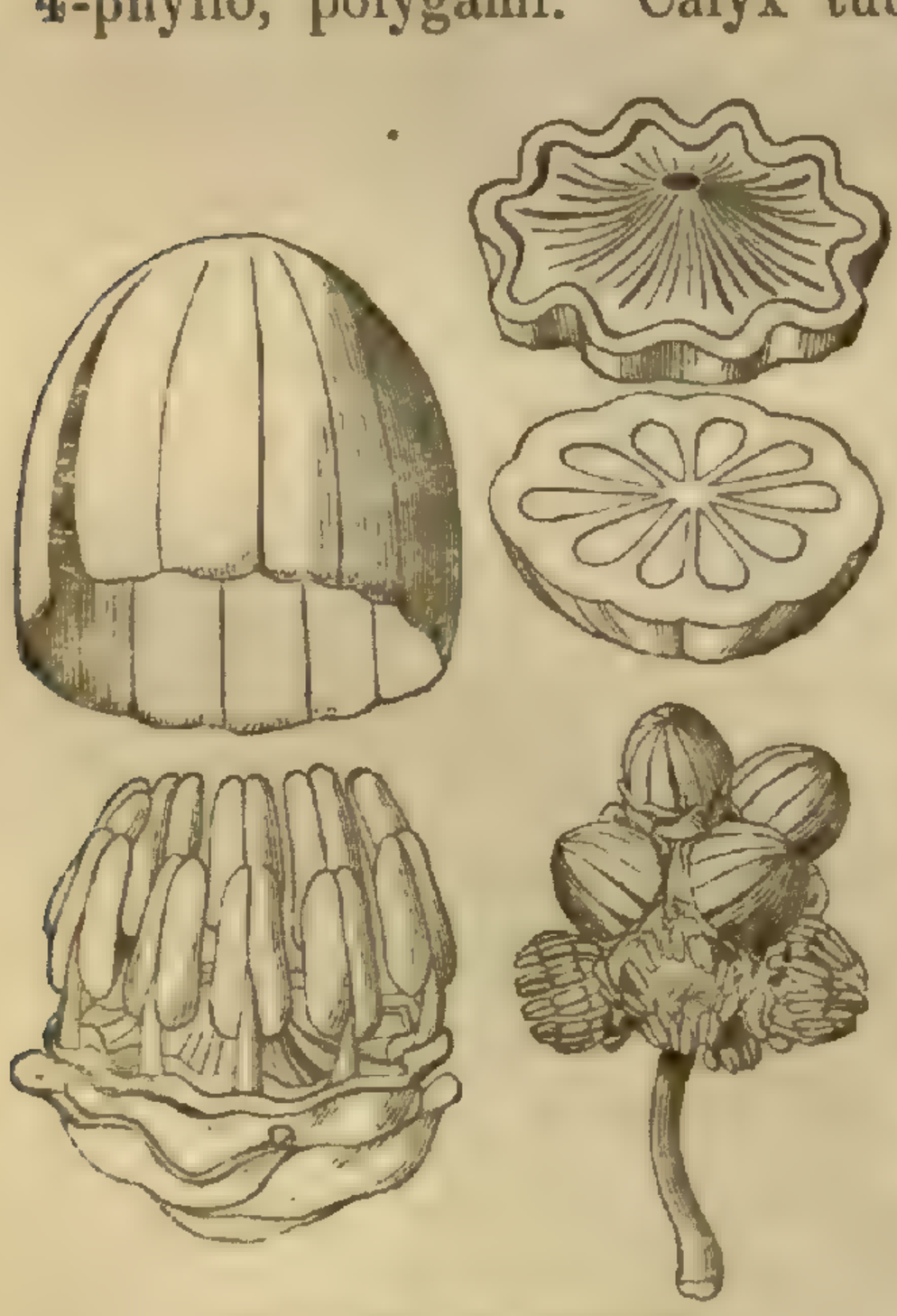
and calyptrate. Hitherto there was only one species known; the second, which I was enabled to add, I have named in honour of the illustrious founder of the genus, *P. Grayi*.

1. *P. Pickeringii*, A. Gray, Bot. Wilkes, p. 729, t. 95 (1854) Walp. Ann. v. 81.—Viti Levu (Seemann! n. 206); Vanua Levu, above Nandy (Milne!); Ovalau, Viti Islands (United States Expl. Exped.). "A tree, called 'Vola' by the natives of Vanua Levu" (Milne).

2. *P. Grayi*, Seem. Viti, Appendix, n. sp.; inermis, glabra, foliis digitatis, foliolis 9 obovato-oblongis obtusis basi in petiolum attenuatis integerrimis, umbellis multiradiatis, umbellulis 26-floris, calyce post anthesin repando-undulato, petalis 5 valvatis oblongis acutis calyptratim cohærentibus, mox deciduis, staminibus indefinitis, stigmate obscure multiradiato, ovario 12–15-loculari, drupa obovata obscure 12–15-costata.—Viti Levu, Viti Islands (Seemann!, n. 208).

A small tree. Petioles 12 inches, petiolules $1\frac{1}{2}$ inch long. The upper leaflets the largest, and their blade 6–7 inches long and $2\frac{1}{2}$ inches broad. Flowers greenish. Drupe about $\frac{3}{4}$ of an inch long, $\frac{1}{2}$ inch in diameter. Stigma depressed in the male flowers, on conical stylopodia in the hermaphrodite.

IV. Brassaia, Endl. Pedicelli nulli. Flores calyculati, calyculo 4-phyllo, polygami. Calyx tubo obconico, limbo truncato. Petala linearia, 7–17, plerumque 12, calyptratim cohærentia. Ovarium 7–17-loculare, vertice exserto multicostatum, loculis 1-ovulatis. Stigma sessile, 7–17-radiatum, stylopodio conico impositum. Drupa angulato-sulcata, 7–17-vulgo 12-locularis.—Arbores inermes, Novam Hollandiam, Novam Guineam, Amboynam et Sumatram incolentes, stipulatæ, foliis digitatim 7–16-foliolatis, foliolis subintegerrimis, capitulisracemosis, pedicellis subnullis.—*Brassaia*, Endl. Nov. Stirp. Mus. Vindob. Dec. n. 100; Gen. Plant. Suppl. i. p. 1415. *Parapanax*, Miq. Fl. Nederl. Ind. Suppl. i. p. 339, ex parte *Sciadophylli*, *Paratropiæ* sp. auct.



Brassaia actinophylla.

The genus *Brassaia*, though well defined by Endlicher, has not been recognized by other botanists. Several years after its publication (1843) Bentham described a new *Hederacea* from New Guinea, which he referred to *Sciadophyllum*, and which, in 1856, was transferred to *Paratropia* by Miquel, though he had not seen the plant; and, in order to admit it into that genus, had to amplify the generic character. More recently the same author, still unaware of the existence of *Brassaia*, established the genus *Parapanax* upon two Sumatran species, without, however, suspecting that his *Paratropia macrostachya* was congeneric with one of them. It is to be hoped that, in future, this truly natural genus will be more generally recognized. We now know representatives of it from tropical New Holland, New Guinea, Amboyna, and Sumatra, and the intermediate regions will doubtless supply additional species.

1. *B. actinophylla*, Endl. Nov. Stirp. Mus. Vindob. Decad. i. p. 89; Walp. Rep. i. p. 430, v. p. 925; F. Mueller, Fragmenta, ii. p. 108.—Tropical parts of Eastern Australia (Sir Joseph Banks! A. Cunningham! n. 484, of Second 'Mermaid's' Voyage in Mus. Brit., Robert Brown! in Herb. Hook.)

This fine tree was first discovered by Sir Joseph Banks, next found by Robert Brown, and afterwards met with "at Pine Head and similar situations" of the east coast of New Holland, north of Endeavour River by A. Cunningham, who, in his journals sent to Sir J. Banks, enumerates it under n. 484, as an *Urticacea*, appending to it the following note:—"Amentum [capitulum] 8–10-florum, subglobosum, pedicellatum, pedicello crasso. Flores 12-andri, hermaphroditi. Calyx semisuperus, subcyathiformis, dentibus [*i. e.* petalis] apice conniventibus deciduis, 3-bracteatus. Stam. 12, antherifera, calyci inserta. Anth. 2-locul. Ovarium 10-loculare. Stigm. sessile, radiatum.—Arbuscula 16–20 ped. ramis crassis brevibus, foliis 7–12-nis, foliolis ellipticis petiol. glabris mucronatis obtusis." From Dr. F. Mueller (Fragm. l. c.) we learn that Mr. Charles Moore found this tree near Boyn River, Mr. Eug. Fitzalan near Port Molle, and Leichhardt in those parts of E. Australia which he crossed. By the last-named author the tree is stated to be forty feet high, and the leaflets varying in number to sixteen. According to Ch. Moore the flowers are said to be *scarlet*, but this statement is not confirmed from what is known from other sources, nor borne out by an inspection of the specimens before me. In the copy of

'Endlicher's Iconographia'' which I have consulted, there is no plate of this *Brassaia*, though Endlicher quotes it himself; and C. Koch says ('Wochenschrift,' 1859) that it has never been published.

2. *B. macrostachya*, Seem. mss.—*Sciadophyllum macrostachyum*, Benth. in Lond. Journ. of Bot. ii. (1843), p. 222; Walp. Rep. ii. p. 939. *Paratropia macrostachya*, Miq. in Bonplandia, 1856, p. 139. —New Guinea (Hinds! in Herb. Benth.).

3. *B. littorea*, Seem.—*Papaya littorea* seu *Papaja Pante*, Rumph. Amb. i. p. 150. t. 52.—Halong, Amboina, rare (Rumphius).

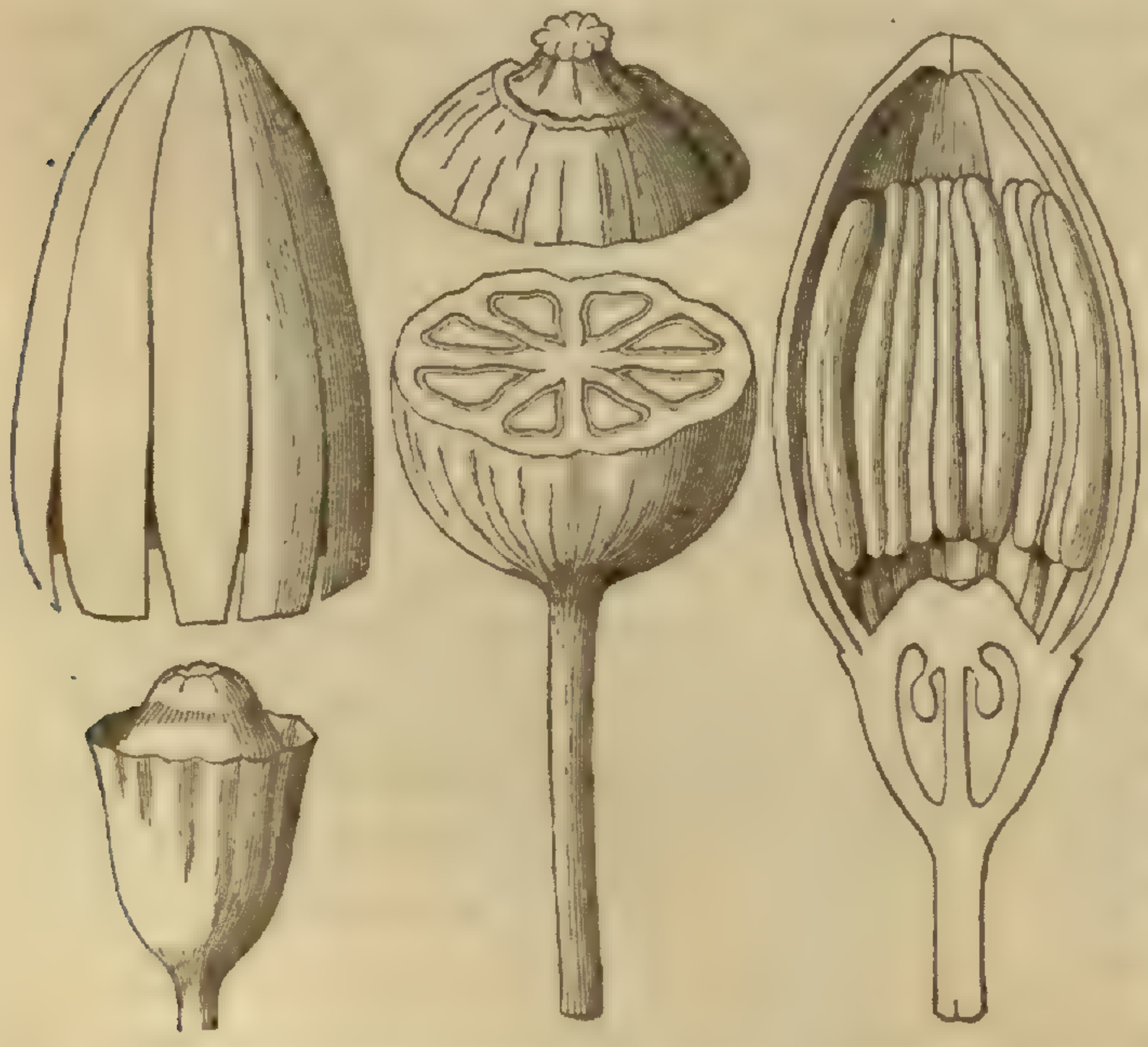
Leaves over 3 feet long, leaflets 13–16 elliptico-lanceolate, 12–15 inches long, 3 inches broad, acute on both ends. Racemes paniculate, over a foot long. Called by some Amboinese "Lau Takka," from the resemblance of its leaves to those of *Tacca*. Does not seem to have been collected since the time of Rumphius.

4. *B. sessilis*, Seem. mss.—*Parapanax sessile*, Miquel, Fl. Nederl. Ind. Suppl. i. p. 339.—Western Sumatra, near Lolo (Teijsmann).

Species exclusa:—

B. palmata, Dcne. et Planch. = *Trevesia Sundaica*, Miq. fide C. Koch.

V. Reynoldsia, A. Gray. Pedicelli inarticulati. Flores ecalyculati, polygami. Calyx tubo obconico, limbo integerrimo v. subrepando. Petala linearia, 8–10, calyptratim cohærentia. Stamina 8–10, uniserialia; antheræ lineares. Ovarium 8–18-loculare. Stigma 8–18-radiatum, stylopodio conico impositum. Drupa baccata, globosa, 8–18-pyrena, pyrenis cartilagineis. Embryo minu-



Reynoldsia Sandwicensis (*after A. Gray*).

tus, radicula supera cylindrica.—Arbores insularum Oceani Pacifici, inermes, glabræ, exstipulatæ, foliis pinnatim 3–9-foliolatis, foliolis ovatis v. subcordatis dentatis, umbellis paniculatim compositis.—*Reynoldsia*, A. Gray, Bot. Wilkes, p. 723, t. 92 et 93; Walp. Ann. v. p. 82.

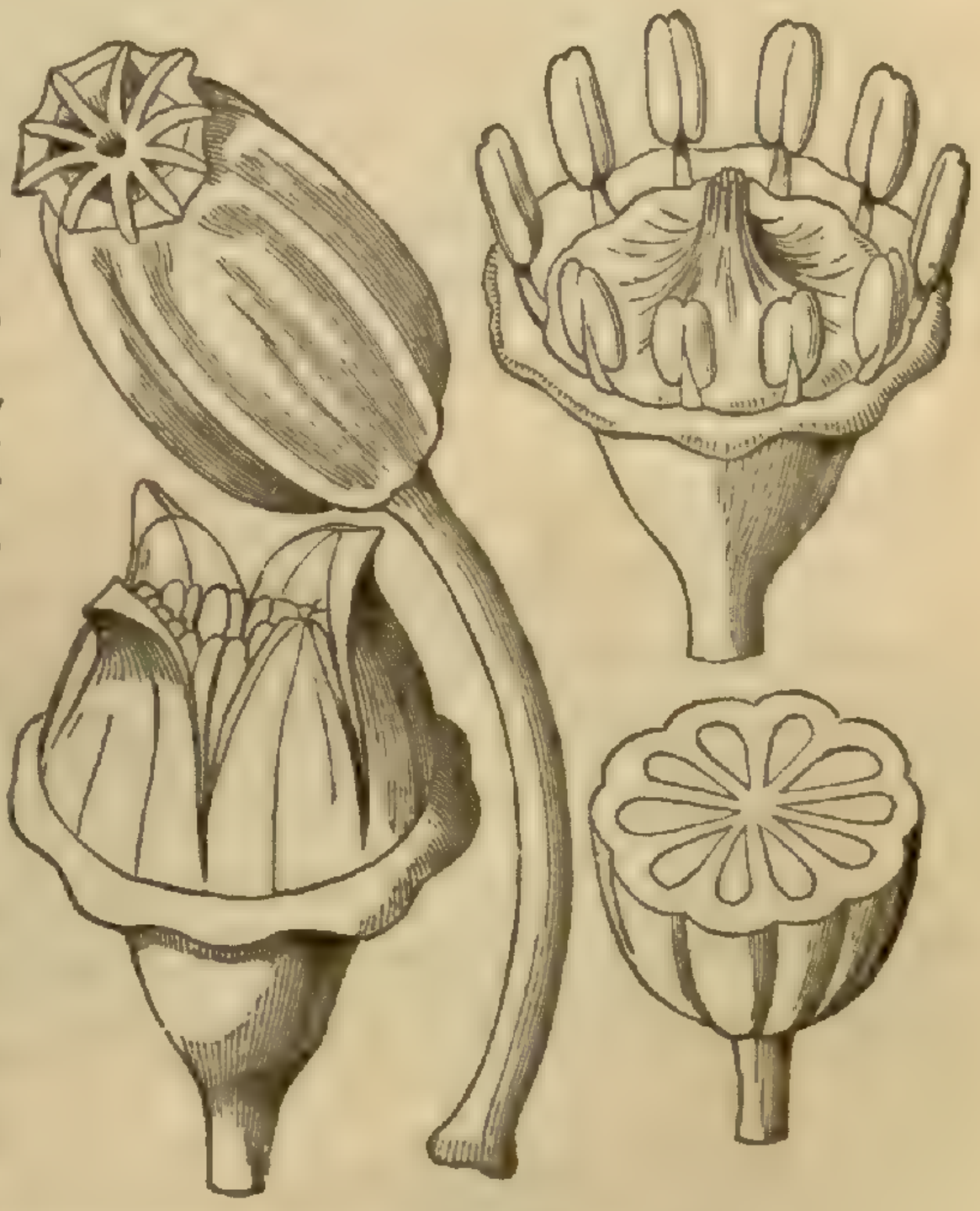
1. *R. Sandwicensis*, A. Gray, Bot. Wilkes, p. 724, t. 92; Walp. Ann. v. p. 82.—In a ravine near Waianæ, Oahu, Hawaiian (Sandwich) Islands.

2. *R. pleiosperma*, A. Gray, Bot. Wilkes, p. 725; Walp. Ann. v. p. 82.—Forests of Savaii, Samoan (Navigator) Islands.

3. *Reynoldsia verrucosa*, Seem. n. sp.; foliis pinnatis, foliolis 3–4-jugis cum impari ovatis acuminatis dentatis, dentibus glanduloso-verrucosis, umbellis 5–7-floris, pedicellis ancipitibus, calyce undulato-multidenticulato, corolla clausa subobovata, petalis staminibusque 7, ovario multiloculari, stigmate multiradiato, fructu . . .—Tahiti (Nelson! collected in Captain Cook's third voyage).

Differs from the allied *R. pleiosperma* of the Samoan Islands in the quite warty teeth of the leaves, and compressed pedicels. The whole plant glabrous. Leaflets petiolulate, $2\frac{1}{2}$–3 inches long, $1\frac{1}{2}$ inch broad. The umbels axillary, shorter than the leaves. All the flowers in Nelson's specimens hermaphrodite.

VI. Gastonia, Comm. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calycis tubo obconico, angulato, limbo subintegro. Petala 11, linearia, 1-nervia, basi plus minus cohærentia, æstivatione valvata. Stamina petalorum numero æqualia; antheræ oblongæ. Styli 8–10, basi ima connati, erecti, demum recurvi. Drupa oblonga, 8–10-costata, 8–10-locularis.—Arbor Mauritiana, foliis imparipinnatis, foliolis 5 integerrimis, umbellis paniculatis, paniculis termina-



Gastonia cutisponga.

libus.—*Gastonia*, Comm. in Juss. Gen. 217 ; Lam. Dict. ii. p. 610 ; De Cand. Prodr. iv. p. 256.

The genus *Gastonia* has been incorrectly described. De Candolle ('Prodromus'), to go no further back, assigns to it from 5–16* petals, and double the number of stamens, two stamens being said to be placed before each petal. Decaisne and Planchon describe the petals as 3-nerved. All three are wrong. The stamens in this, as in all other genera of the Order with definite stamens, alternate with the petals, and are equal in number with them; and they are always 1-nerved. What has given rise to the belief of their being 3-nerved is that they are very narrow, and are more or less coherent, in some instances not separating at all from each other, so that the corolla appears to have fewer petals than it really has. The normal number of petals and carpels seems to be 10. But there are sometimes fewer by abortion, or more by excess.

Gastonia is closely allied to *Grotefendia*, a genus also inhabiting the islands of Eastern Africa. Both have imparipinnate leaves and very narrow petals, but they are easily distinguished from each other, viz. :—

Gastonia. Pedicelli inarticulati. Flores ecalyculati.

Grotefendia. Pedicelli articulati. Flores calyculati.

1. *G. cutisponga*, Lam. Dict. ii. p. 610 ; De Cand. Prodr. iv. p. 256 ; *G. spongiosa*, Pers. Ench. ii. p. 20 ; *Bois d'éponge*, incolarum.—Mauritius (Sieber! Fl. Maurit. Exs. ii. p. 197, Carmichael! Bouton! in Herb. Kew.), growing in woods, abundantly in Mount "Pouce."

2. *Species dubia*, indescripta :—*G. sauruoides*, Roxb. Cat. Hort. Calc. p. 70 ; *Gilibertia sauruoides*, De Cand. Prodr. iv. p. 256, in the Moluccas.

Species exclusæ :—

G. aculeata, Hortor. = *Cuphocarpus aculeatus*, Dene. et Planch.

G. Candollei, Hortor. = *Brassaiopsis speciosa*, Dcne. et Planch.

G. dentata, Hortor. = *Brassaiopsis speciosa*, Dcne. et Planch.

G. longifolia, Hortor. = *Brassaiopsis speciosa*, Dcne. et Planch.

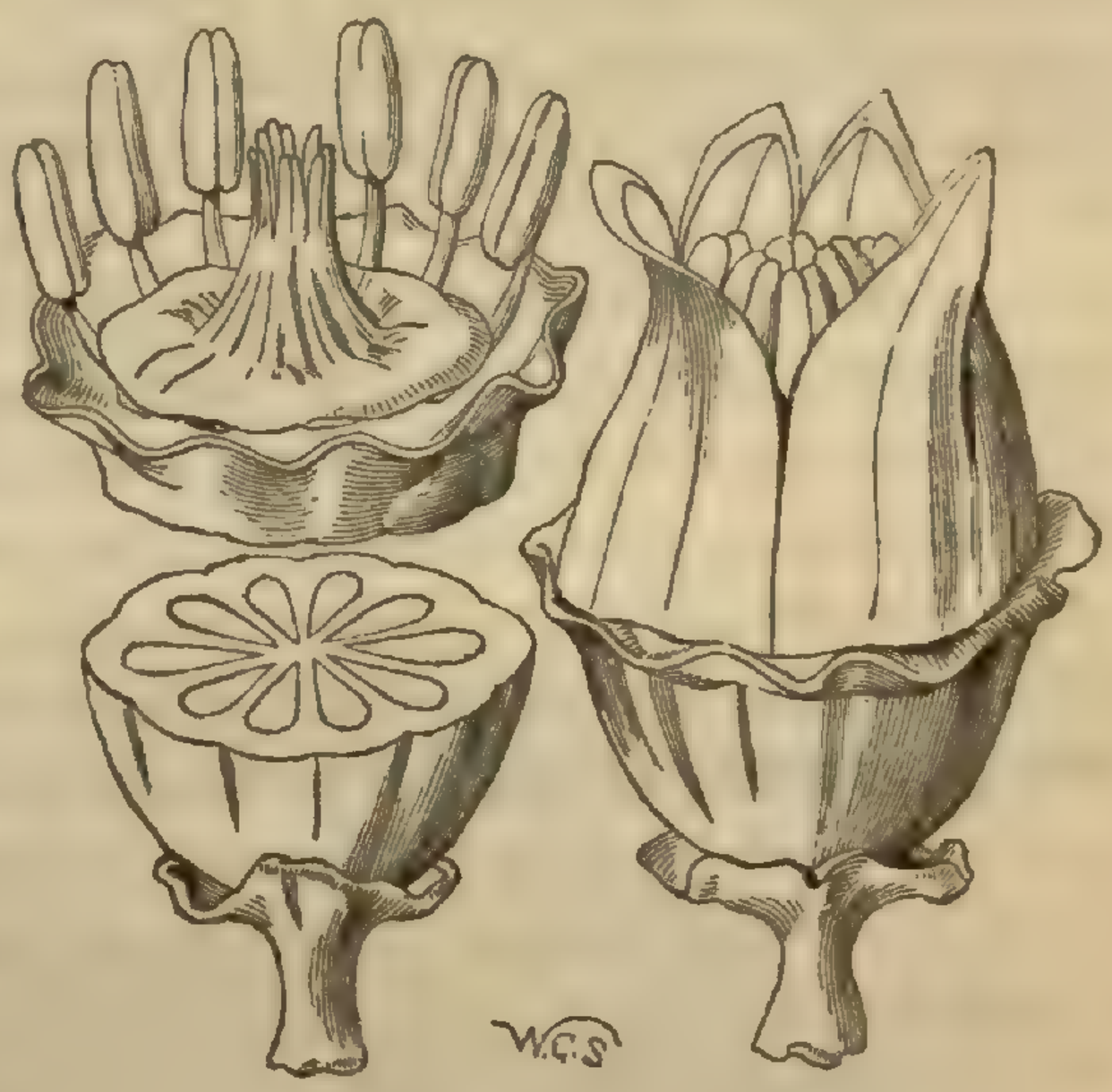
G. Nalugu, Lam. (*Gilibertia Nalugu*, De Cand.) = *Leea staphylea*, Roxb. teste Wight et Arn. Prodr. ; = *L. sambucina*, Willd. teste Miq.

G. (?) Oahuensis, A. Gray, Bot. Wilkes, p. 726, is the type of a new genus.

G. palmata, Roxb. = *Trevesia palmata*, Visian.

* "16" may possibly be a misprint for "6," else the number would be 32.

VII. Grotefendia, Seem. n. gen. Pedicelli articulati. Flores calyculati, hermaphroditi. Calyx tubo obconico angulato, limbo obscure 5–6-lobato v. subintegerrimo. Petala cuneato-linearia, 1-nervia, 11–13, basi cohærentia, æstivatione valvata. Stamina 11–13; antheræ lineares. Pollen ellipticum. Styli 5–10, compressi, erecti v. demum recurvi. Ovarium 5–10-loculare, loculis 1-ovulatis. Drupa oblonga, costata v. sublævis.—Arbores Mauritianæ, foliis exstipulatis, imparipinnatis, foliolis integerrimis v. obsolete dentatis, floribus umbellatis v. racemosis, umbellis v. racemis paniculatis.



Grotefendia cuneata.

This genus I have named in honour of Dr. Grotefend (one of the earliest decipherers of cuneate writings, and Director of the college in which I was educated), and of his son, to whom I am indebted for my first lessons in botany.

1. *G. cuneata*, Seem. mss. Glabra; foliis imparipinnatis, foliolis 11 longe petiolulatis ovatis v. subrotundato-ovatis obtusis basi acutis v. obtusis, penninerviis, subrepando-dentatis v. integerrimis, floribus racemosis, pedicellis subnullis, calyculo 5-dentato, calycis tubo obconico, limbo subintegro, petalis cuneato-linearibus 13 1-nerviis plus minusve coalitis, staminibus 13, antheris linearibus, pollinis granulis ellipticis, stylis 10 basi læviter cohærentibus, ovario 10-loculari, loculis 1-ovulatis. —*Gastonia spongiosa*, Herb. Hook. non Pers.—Mauritius (Carmichael! in Herb. Hook.; Hardwicke! in Mus. Brit.).

Leaflets 3–3½ inches long, 2½–3 inches broad; petiole ½–⅔ inch long.

2. *G. paniculata*, Seem. mss. Glabra; foliis imparipinnatis, foliolis 7 oblongis elliptico-oblongis acutis v. obtusis basi acutis integerrimis penninerviis, floribus racemosis, pedicellis articulatis brevissimis, calyculo 5-dentato, calycis tubo obconico, 5–6-angu-

lato, limbo 5–6-dentato, petalis cuneato-linearibus 11 1-nerviis, plus minusve cohærentibus, staminibus 11, stylis 5–7 compressis erectis demum recurvis, fructu oblongo 5–7-angulato 5–7-loculari.—*Gastonia heptagyna*, Herb. Hook.; *Gilibertia paniculata*, De Cand. Prodr. iv. p. 256.—Mauritius, in mountainous forests (Carmichael! Bouton! in Herb. Kew.).

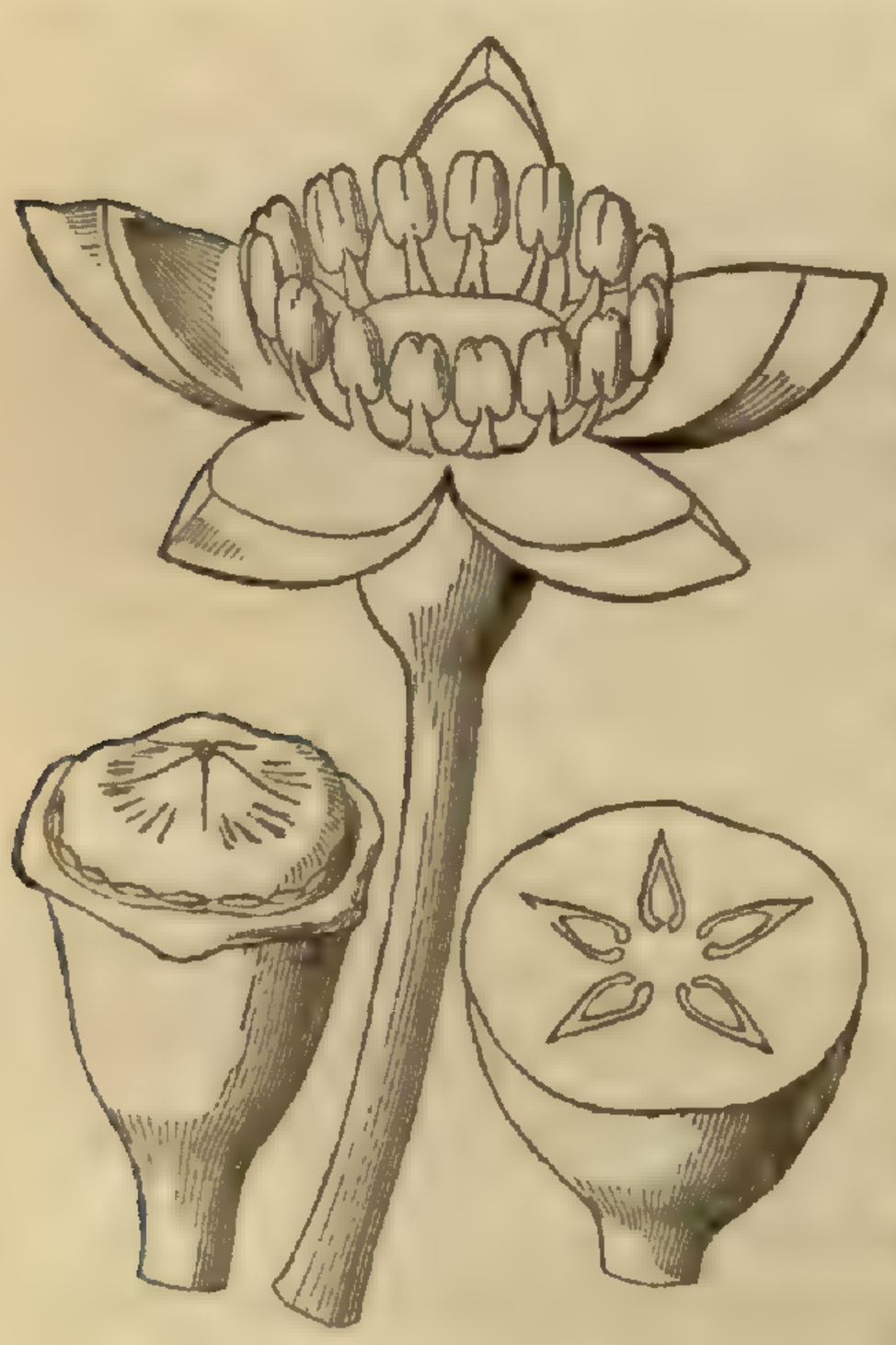
Leaflets 6–7 inches long (or smaller), 3–3½ inches broad.

That *Gilibertia paniculata*, De Cand., described from a scrap, is a synonym of this species, I was able to determine from a few flowers kindly sent to me by M. Alph. de Candolle for that purpose.

3. *G. repanda*, Seem.—*Gilibertia repanda*, De Cand. Prodr. iv. p. 256.—Mauritius (Bory! in Herb. De Candollei).

Easily distinguished from the foregoing species by its umbellate flowers and long pedicels. I am indebted to M. Alph. de Candolle for a sight of a few flowers of this species, sufficient for determining the genus.

VIII. BAKERIA, Seem. mss. n. gen. Pedicelli inarticulati. Flores ecalyculati. Calyx tubo turbinato cum ovario connato, limbo brevissimo repando-undulato. Petala 5, ovato-triangularia, æstivatione valvata, apice incurvula, libera, intus 1-nervia. Stamina 15, uniserialia; filamenta compressa; antheræ oblongæ. Ovarium 5-loculare, loculis 1-ovulatis. Stigma obscure 5-fidum, stylopodio subconico brevi 5-angulato sulcato impositum; fructu . . .—Arbor Vitiensis mediocris, glaberrima, inermis, foliis digitato-5-foliolatis, foliolis longe petiolulatis obovato-obtusis v. acutis in petiolum angustatis integerrimis, petiolo basi stipulato-dilatato (ut in *Agalma*), umbellulis umbellatis exinvolucratis, floribus viridiusculis.



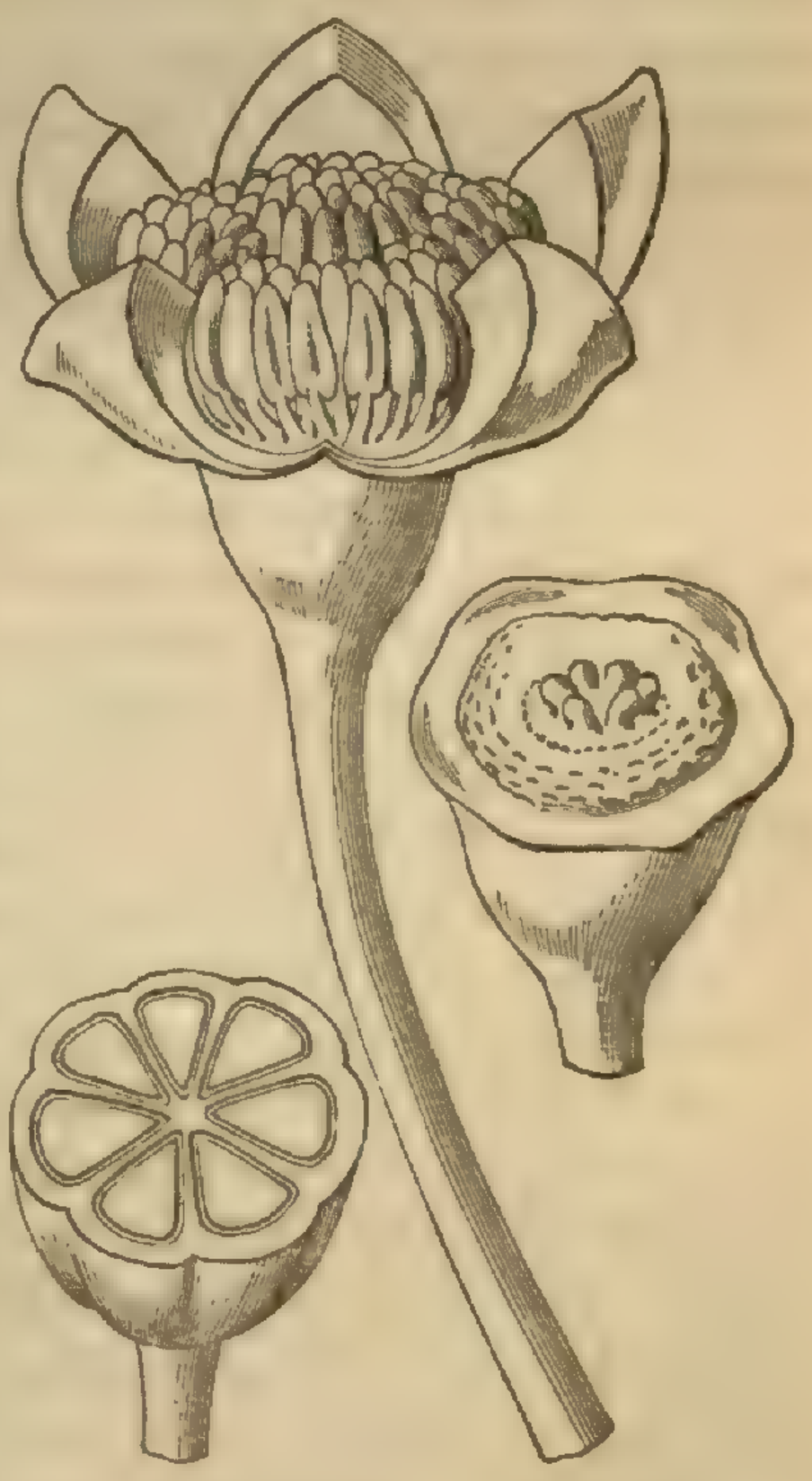
Bakeria Vitiensis.

This new genus, named in honour of Mr. J. G. Baker, of Thirsk, Yorkshire, a distinguished British botanist, differs from *Plerandra* in having free petals, a definite number of stamens (15) arranged in a

single series, and a 5-celled ovary; from *Tetraplasandra*, in having only 5 petals and a 5-celled ovary, and a different habit; from *Reynoldsia*, in having three times as many stamens as petals, and a 5-celled ovary; and from all the other genera of the Order in having 5 free petals, 15 stamens, and a 5-celled ovary. There is only one species, viz. :—

1. *B. Vitiensis*, Seem. n. sp.; a slender tree; petioles 4–5 inches long, petiolules 1 inch long; blade of leaflets 3–4 inches long, 1½–2 inches broad; pedicels 4-angular, not articulated.—Namosi, interior of Viti Levu (Seemann!, 209); also collected in the same island (foliage only), twenty miles inland, and there plentiful, by Milne.

IX. NESOPANAX, Seem. n. gen. Pedicelli inarticulati. Flores ecalyculati. Calyx tubo obconico, cum ovario connato; limbo supero, obsolete 5-dentato. Corollæ petalâ 5, ovato-triangularia, disci epigyni margini inserta, libera, æstivatione valvata. Stamina indefinita, cum petalis inserta, pluriserialia; filamenta brevia; antheræ oblongæ. Ovarium inferum, 5–7-loculare. Ovula in loculis solitaria, pendula. Styli 5–7, breves, distincti; stigmata simplicia. Drupa oblonga, 5–7-locularis, calycis limbo stylisque coronata.—Arbor Vitiensis mediocris, glabra, inermis, foliis digitatis, foliolis 7–9 obovato-oblongis utrinque attenuatis integerrimis, petiolis basi stipulato dilatatis, umbellis multiradiatis, umbellulis 26–30-floris, floribus viridibus.



Nesopanax Vitiensis.

This genus differs from *Plerandra*, A. Gray, in having free petals, 5–7 distinct styles, and a 5–7-celled drupe. It agrees with it in habit, and the indefinite number of stamens. I have only one species:—

1. *N. Vitiensis*, Seem. n. sp.—Viti Islands (Seemann! n. 207, Milne!).

Petiole 1½ feet long. Leaflets pinnately veined, coriaceous; blade

6–7 inches long, $2\frac{1}{2}$-3 inches broad; petiolules $1\frac{1}{2}$–2 inches long. Peduncles 6–8 inches long. Pedicels of fruiting specimens $1\frac{1}{2}$–2 inches long. There is no ripe fruit.

(*To be continued.*)

MEMORANDA.

American Tea-Plant.—A newspaper announcement states that the Tea-Plant has been discovered by a Chinaman (or as some say, by an Englishman formerly engaged in the tea culture in Assam) in the United States, "covering a large area of land in the central counties of Pennsylvania," and that tea of excellent quality and various sorts, green and black, has been made for the market by a company organized for the purpose. We are told that the agent of the company exhibits in this connection a drawing, which is recognized as representing a genuine Tea-plant. A specimen of the prepared tea has been shown to us, by which we recognize that this American Tea-plant is the well-known *Ceanothus Americanus*, the *New Jersey Tea*, the leaves of which were used for this purpose at the beginning of the American revolution. Some one has remarked that the substituted beverage must have tried the patriotism of our great-grandmothers, but others report more favourably of its qualities. (A. Gray, in 'American Journal of Science.')

The Compass Plant.—Riding near Chicago, August 8th, 1863, I saw, for the first time, *Silphium laciniatum* growing wild. The field had once been ploughed and sown with timothy, and there was a grove a few rods to the east. Notwithstanding these unfavourable circumstances, I took a rough measurement of thirty plants, without selection, as follows:—Holding a card over each plant with its edge parallel to the central line of my own shadow, I marked upon the card a short line parallel to each leaf of the plant. Measuring afterward the angle which each mark made with the edge of the card, and subtracting from each angle the azimuth of the sun for the estimated central time of observation, I obtained the following results:—Only one plant, bearing four old leaves, gave an average angle with the meridian of more than 34°. Their mean was 18° west. The remaining twenty-nine bore ninety-one leaves, which made with the meridian the following angles, viz. seven made angles greater than 35°; fifteen, angles between 35° and 20°; sixteen, angles between 20° and 8°; twenty-eight, angles between 8° and 1°; and twenty-five, angles less than 1°. Of the sixty-nine angles less than 20°, the mean is N. 33′ E., *i. e.* about half a degree east of the meridian. The error of azimuth, from my want of means to determine the time accurately, may have been as much as three times this quantity. One-half the leaves bear within about half a point of north, two-thirds within a point. The magnetic declination was about 6° east. The

observations were made when the sun was about on the magnetic meridian. (T. Hill, in 'American Journal of Science.')

New Coal-Plants of Nova Scotia.—At the Newcastle Meeting of the British Association was read a paper, by Dr. Dawson, on *Lepidophloyos Acadianus* and *Lepidodendron corrugatam*, two plants very characteristic, in Nova Scotia, of the lower coal-measures associated with the lower carboniferous limestone. The author concluded that *Lepidophloyos Laricinum*, Sternberg, was founded on the fragment of the bark of an old trunk, having the leaf-bases flattened, and hence described as scales. The genus *Ulodendron* was, he thought, identical with *Lepidophloyos*, but apparently founded on specimens having the leaf-bases preserved, with the cone-scars, but wanting vascular scars; but he was in doubt as to the claims of the name *Ulodendron* on the ground of priority. It appeared to him that the generic names *Ulodendron*, *Lomatophloyos*, *Leptoxylum*, *Pachyphlœus*, and *Lepidodendron*, should be abolished in favour of *Lepidophloyos*, unless any of these names had priority in date. The second plant described was the *Lepidodendron corrugatum*, one of the most abundant in the lower coal-measures of Nova Scotia and New Brunswick. The species was remarkable for its variability, and also for the dissimilar appearances of old stems and branches occasioned by the separation of the areoles in the growth of the bark, instead of the areoles themselves increasing in size, as in some other Lepidodendra.—Mr. Sorby remarked that the tendency of the paper was to show that there were a number of genera, that appeared to be quite distinct, that were only different stages of preservation and growth of the same plant.—The President said that Dr. Dawson had for many years worked the fossil botany of the coal-fields of Nova Scotia in a manner deserving of praise. This subject naturally commended itself to attention in the town of Newcastle, where Hutton and Lindley did so much to establish the knowledge of the principal forms of the coal-plants. The paper was one of a series of communications by Dr. Dawson sent to this country, giving facts and deductions with respect to the boundaries of the several species and genera of coal-plants, which showed that simplification might be introduced in the classification of them, and also making them acquainted with their internal structure, and the part they played in the formation of coal. Nothing could be more interesting than the observation that some of the bright coals in Nova Scotia approached in their mineral character nearly to those of this district, and that they appeared to be formed entirely of compressed stems, and more especially of bark, principally lepidodendroid and sigillaroid. They had present Mr. Binney, of Manchester, who first laid it down that *Stigmaria* were the roots of certain of the principal coal-plants, more especially of the *Sigillaria*; he would therefore call on Mr. Binney to tell them what he thought of the conclusions of the author of the paper, and more especially of the fusion he would make of sundry genera and species.—Mr. Binney scarcely thought they would be justified in going so far as was suggested, but he approved of much that was said in the paper.

Kaju Garu (Gonystylus Miquelianus, *Teijsm. et Binn.*), a sweet-smelling Wood of the Indian Archipelago.—Besides the Benzoin, the

Malays use a sweet-smelling wood, the Kaju Garu, as a remedial agent, and as a kind of incense against violent rain, etc. The wood, sold in the markets in small bits and at a low price, is taken in long flat pieces from the inner part of the stem of old trees, which have either fallen down or have been felled for that purpose. It is filled with an oily substance, and diffuses, on being burnt, a peculiar smell, somewhat like that of rhubarb. The Kaju Garu is one of the inferior sorts of odoriferous wood, about which Rumphius, Herb. Amboin. ii. p. 29, ought to be consulted. It seems to come very near the Bastard-Agel-Holze which that author afterwards mentions. In Bengal there is another sort, derived from *Aquilaria Agallocha*,* the wood of which is finely grated and boiled in water, when the oil comes to the surface. *Ag. Agallocha* seems also to grow in Borneo, Sumatra, and Banca : and young plants from the first-named island are now cultivated in the Botanic Garden at Buitenzorg. The species found in Java does not seem to be described. For a long time we made unsuccessful efforts to learn something about its flower and fruit, but now we know that the tree blossoms in April and May ; and through the kindness of Mr. Tin Cate, of Tjampea, near Buitenzorg, we have lately received the long-expected flowers. The tree proves to be an *Aquilarinea*, resembling in habit the *Mammea Americana* and other allied genera ; the style is very like that of *Calophyllum*, *Mesua*, etc. The leaves of the young trees are very different from those of the old ones ; even on the same tree the leaves of the younger branches are very unlike those of the old. The flowers being very different from those of *Aquilaria*, it became necessary to establish a new genus, the name of which has been derived from the style. *Gonystylus Miquelianus* is a tall tree, with alternate, oblong leaves, axillary or terminal spikes, and roundish drupes. It grows in the forests of the mountains of Java and Sumatra ; and *Aquilaria (?) macrophylla*, Miq., and *A. Bancana*, Miq., may perhaps prove congeners. (Teijsmann and Binnendyk, in Bot. Zeitung, 1862, p. 265.)

NEW PUBLICATIONS.

Thirsk Natural History Society. Curator's Report for 1863. Thirsk, 1864. 8vo.

The Curator's Report for 1863 of the Botanical Exchange Club, in connection with the Thirsk Natural History Society, has recently been printed, and contains, as usual, remarks on most of the novelties and doubtful plants of our flora to which attention has been called during the year in this Journal, Mr. Symes's edition of 'English Botany,' and

* See D. Hanbury's excellent paper on this subject in 'Pharmaceutical Journal,' vol. iii. (1862), p. 317. Kaju Garu or Kayu Garu is the Malay name under which real Lignum Aloes is sold at Singapore.—Ed.

elsewhere. As instances of the plants which have been distributed by the club, may be mentioned amongst others equally good, *Caltha Gueran-gerii*, Mr. Baker's cornfield Pansies, *Hypericum undulatum* and *lineolatum*, *Galium erectum* var. *diffusum*, and *Galinsoga parviflora*, which appears to be now as well naturalized as a plant can be, in the neighbourhood of Kew. The well-known Cambridgeshire *Delphinium* is distributed as *D. Ajacis*, and not *D. Consolida*. Mr. H. C. Watson distributes *Chenopodium rubrum* and *C. botryoides* with the following remarks :—

"These examples of *C. rubrum* and *botryoides* 'are sent in order to assist in correcting some confusion of their names which has lately gained currency on the labels of specimens and in printed books. A small variety of *C. rubrum*, which is usually found on the gravelly or muddy margin of ponds frequented by geese, has been frequently mis-labelled with the name of *C. botryoides*, apparently on account of its nearly entire and fleshy leaves, although its inflorescence is the short dense spike of *C. rubrum*. This variety is consequently named *C. rubrum* var. *pseudo-botryoides* on the labels, and by other accompanying specimens it is shown to pass gradually into the typical form of *C. rubrum*, not into *C. botryoides*. The specimens of this latter very local species were gathered by Mr. Watson and Mr. Boswell Syme on the shore of Pegwell Bay, in East Kent, in September last. The only other localities certain for *C. botryoides* are those of Gravesend in the same county, where the plant was found by Mr. Syme, in 1852, and the long-known one of Yarmouth, in Norfolk. To these counties that of Essex will probably be added, although some doubt still attaches to the records in that county. In most or all of the other alleged localities it is the variety of *C. rubrum* which has been misnamed *botryoides*.'"

It is to be hoped that Mr. Hanbury has sent few examples of *Carex circetorum*, or we should greatly fear the plant will be lost in its only known British station, which, however, is little likely to be the only one. The Report concludes with a list of desiderata for 1864, and a notice that to entitle senders to a share in the distribution of the year, parcels must be forwarded carriage-paid prior to the 31st of December. We may remind young contributors to attend to the goodness as well as the rarity of the specimens they send, and they will have no reason then to complain of the return parcels they may receive.

Notes on Wild Flowers. By a Lady. London: Rivingtons. 1864. 520 pages.

Somewhat arranged after Miss Catlow's plan, in her 'Popular Field

Botany,' giving pleasant chit-chat of the most prominent wild flowers as they appear month after month. The author still clings to the Linnæan system, holds Withering's faults in greater veneration than the present generation of botanists, and makes here and there a few blunders; but on the whole she has done her best, and her book will help to make botany popular in circles which could probably not be reached in any other way. Taking it for what it proposes to be, and not more, we should call it a well-executed little book.

The Palm-tree. By S. Moody. With Illustrations by the Author. London: Nelson and Sons.

Those who know how to use it will find in this little book a collection of notes on Palms worth having. We say advisedly, those who know how to use it, because in various instances these notes, derived from whatever books came to hand, are referred to the wrong plants. One-third of the whole is filled with theological botany, intended to illustrate the Scriptural allusions to Palms. The plates, though their colours are somewhat conventional, are effective. The whole is elegantly got up.

BOTANICAL NEWS.

Prof. Asa Gray having made the munificent offer of his extensive Herbarium and Library to the Cambridge University, Massachusetts, upon condition that a suitable fire-proof building should be erected for their reception, a Boston banker has liberally come forward to defray the cost of such a building, provided others raise a fund to meet the current expenses of the establishment. There is reason to hope that these conditions will be fulfilled, that a foundation will thus be laid for a National American Herbarium, and Professor Gray be placed in a position to devote himself more fully to the completion of his great publications on the North American Flora.

Dr. Ernest Stizengerber has just published in the 22nd volume of the 'Nova Acta' "Critical Remarks on the *Lecideaceæ* with needle-shaped spores," illustrated by two quarto plates. The paper having been prepared with care, will prove acceptable to lichenologists in this country.

Mr. Dallachy is now collecting for the Melbourne Gardens in Rockingham Bay in Eastern Australia, and Mr. Travers, of Christ Church, New Zealand, is about to proceed to the Chatham Islands for the purpose of exploring them botanically, his father generously defraying the expenses of the expedition.

The Imperial German L. C. Academy has conferred upon Mr. Richard Spruce the Degree of Doctor of Philosophy, in appreciation of his eminent services as a botanical explorer and traveller

Dr. Welwitsch, the African traveller, has now been several months in London arranging his botanical collections, without doubt the most important and extensive ever made in the tropical parts of Western Africa. The specimens are in a beautiful state of preservation, and accompanied by copious notes, taken when they were gathered. Several botanists are assisting him in naming them, Sir William J. Hooker having taken the Ferns, Dr. Schott the Aroideæ, Dr. Seemann the Bignoniaceæ and Hederaceæ, Dr. Müller the Euphorbiaceæ, etc.

Amongst the recent arrivals in London are Dr. Maximowicz (author of the 'Flora Amurensis'), just returning from Japan; M. Casimir de Candolle, employed in consulting our collections for his memoir on Piperaceæ for the 'Prodromus;' and Dr. Müller, Conservator of De Candolle's Herbarium, who has taken upon himself the gigantic labour of working up the Euphorbiaceæ for the same work, with the exception of the genus *Euphorbia*, already so satisfactorily worked up by M. Boissier.

The Government has given £500 to the sister of the late Dr. Ed. Vogel, who lost his life in Central Africa whilst travelling for the Foreign Office,—giving his services gratuitously. Dr. Vogel was born at Crefeld in 1829, and studied botany and astronomy at Leipzig under Kunze and D'Arrest. His botanical papers were published in the 'Bonplandia,' and his African collections are preserved at the British Museum.

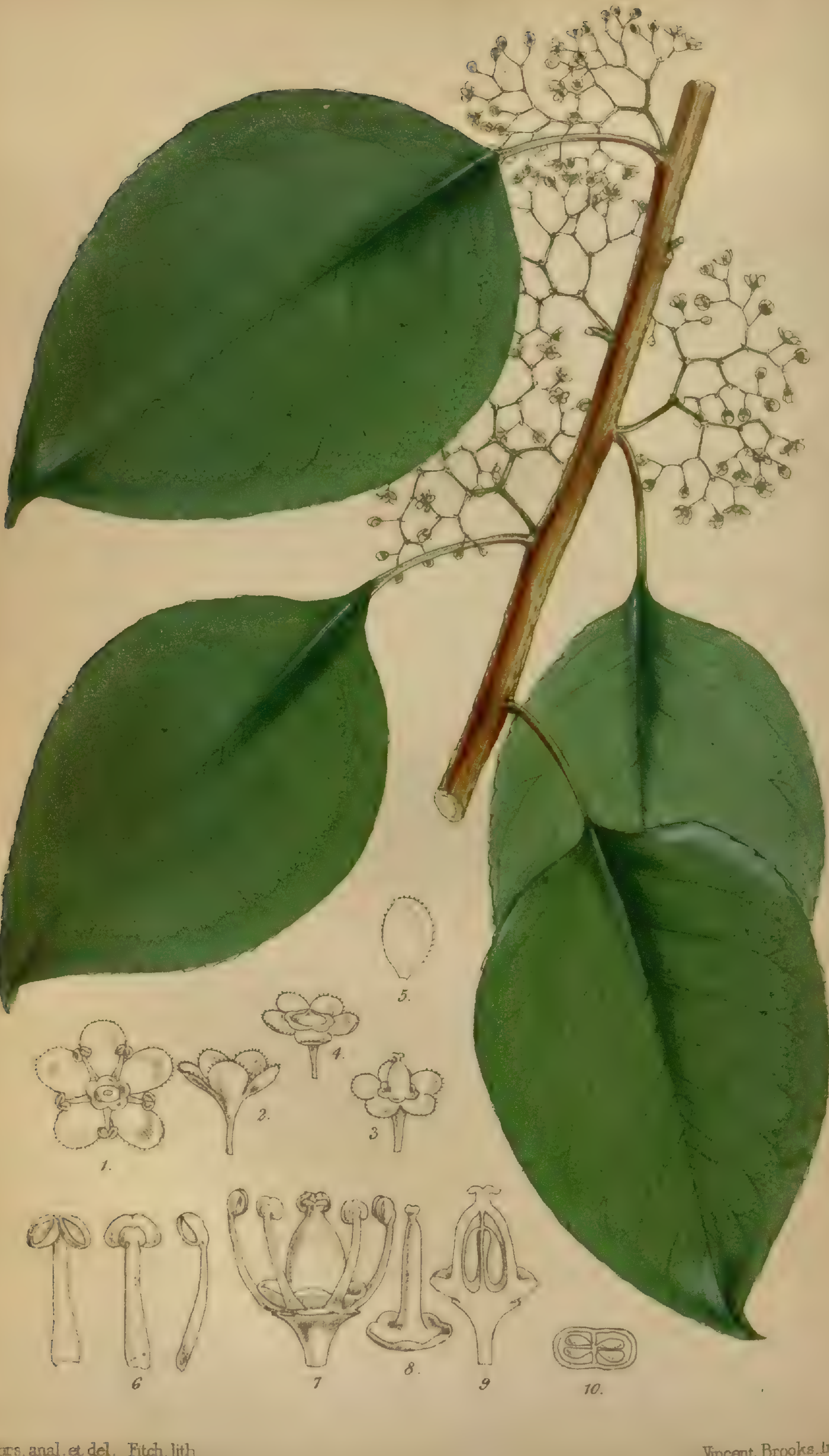
The death of the celebrated traveller and naturalist Francis Junghuhn, Inspector of the Chinchona plantations of Java, and well known by his important labours in the field of botany and ethnography, occurred on the 24th of April last, at Lembang. He started in life as a surgeon in the Prussian army. Condemned, in consequence of a duel, to be imprisoned for twenty years, he escaped after a few months, and became, first, a sanitary officer in the French army in Algiers. He then entered, in the same capacity, the Dutch service in Sonda, where he had collected a vast quantity of materials for scientific works. He died at the age of fifty-two years, leaving a widow and infant son.

Professor Parlatore, of Florence, has brought out a pamphlet, written in French, on the Natural System ('Considérations sur la Méthode Naturelle en Botanique,' Florence), which deserves to be widely known, as emanating from the pen of one of the most distinguished systematic botanists Italy has produced, and is appropriately dedicated to Professor A. Brongniart.

As already stated by us, on the night of May 7th the business-premises and adjoining dwelling-houses of Mr. J. G. Baker and his brother were utterly destroyed by fire; the two families barely escaping with their lives. The amount of insurance was small in comparison with the value of the property destroyed by the very rapid conflagration. Among other losses of greater monetary value, were the botanical library and collections of Mr. J. G. Baker, gradually accumulated during the several years in which his leisure hours have been so assiduously and usefully devoted to science; as also important manuscripts yet unpublished. Under these painful circumstances it is felt by his

botanical friends that some expression of sympathy and condolence ought to be offered in the appropriate form of a subscription towards replacing his lost books. They trust that all true lovers of botany will enter into this feeling; and that by adding their individual subscriptions to the general fund, they will testify their appreciation of Mr. Baker's past disinterested services, and assist in enabling him to continue the same in future years. A very small amount may serve to replace some one lost book or other object, so that no one need be deterred from a modest offering, in case other claims upon him should interfere to prevent a larger one. A few botanists residing in or near London, and acquainted with Mr. Baker,—J. T. Boswell Syme, 70, Adelaide Road, Haverstock Hill, N.W.; William Carruthers, British Museum, W.C.; the Rev. W. W. Newbould, 2, Heathfield Terrace, Turnham Green, W.; Edward Newman, 9, Devonshire Street, Bishopsgate Street, N.E.; Hewett C. Watson, Thames Ditton, near Kingston-on-Thames, S.W.,—have formed themselves into a local committee to carry out the proposed object; the metropolitan centre offering more facility for conferences and for postal correspondence, than would be found elsewhere. They are kindly allowed to refer to Professors Babington, Balfour, Oliver, and other leading botanists, as fully approving the step thus taken. But it is the wish and trust of the committee, that the offering to Mr. Baker should be a testimonial of respect and sympathy from the widest circle of botanists in this country. A printed copy of the subscription list will be sent to each subscriber, by way of closing the appeal. The committee earnestly request other botanists to assist in obtaining the addition of botanical names thereto as generally and numerously as possible. The proper postal addresses of several botanists not being known to them, they must in some degree trust to the kind co-operation of other parties even in simply making this movement and its purpose generally known. Subscriptions by cheque or post-office order will be received by any of the committee. Post-office orders should be made payable to Mr. John Thomas Boswell Syme, at the District Office, Adelaide Road, London, N.W. Sums under five shillings can be remitted in postage-stamps.

Botanical Society of Edinburgh. *March* 10.—1. Researches on Hybridity in Plants. No. II. 2. On the Chemical and Natural History of Lupuline. By M. J. Personne. Translated by Prof. Lawson, of Nova Scotia. 3. Remarks on the Sexuality of the Higher Cryptogams, with a notice of a Hybrid *Selaginella*. By Mr. John Scott. In this paper the author details a series of experiments made in the Botanic Garden of Edinburgh, with species of *Selaginella*, in which he endeavours to show that a hybrid form was produced between *S. Martensii* and *S. Danielsiana* by applying the microspores of the one to the macrospores of the other. He found that the macrospores did not germinate unless the microspores had been applied. Specimens in the hybrid form, as well as of the parent species in a living state, were exhibited. 4. Abstract of a Paper on the Constitution of Gymnospermous Flowers. By A. W. Eichler. 5. List of Fossil Plants found in the Tertiary Strata in the south-east of France. By Gaston de Saporta. 6. Notice of Plants at present in flower in the open air at the Royal Botanic Garden. By Mr. M'Nab.



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ON THE GENUS *VILLARESIA*, WITH A DESCRIPTION OF A NEW SPECIES.

By John Miers, F.R.S., F.L.S., etc.

(Plate XXI.)

In the Annals Nat. Hist. ser. 3, ix. 107, I published a monograph of this genus, of which only the typical Chilean species was previously known; but I there described eight others, six of them being of Brazilian origin. Another species, which forms the subject of the present paper, is from the latter country, and is deserving of especial notice on account of its constantly 2-locular ovary. Jussieu, who described and figured the typical plant, rightly placed the genus in *Aquifoliaceæ*, an arrangement adopted by Endlicher, Lindley, and Reissek. From the examination of a cultivated Brazilian species, I showed, as Jussieu had suspected, that its ovary is normally and sometimes actually plurilocular, and that when it is 1-celled, as generally occurs, this is only in consequence of the abortion of its other cells. From this fact, coupled with the knowledge that its ovules are always somewhat collaterally suspended from near the summit of the dissepiment, and its petals extremely imbricated in æstivation, there remained no doubt that the position of *Villaresia* in *Aquifoliaceæ* had been correctly determined by the botanists above mentioned. Notwithstanding this positive evidence, the authors of the new 'Genera Plantarum' have attempted to reverse this decision by placing *Villaresia* in *Olacaceæ*, arranging it in their tribe "*Icacineæ*;" they offer no new evidence in justification, but assign as their only reason for this singular change in the position of the genus, "ob ovarium 1-loculare ad *Olacineas* referetur." I will therefore endeavour to prove satisfactorily that *Villaresia* has no connection whatever with that family.

This brings us back to the consideration of the structural differences between the *Icacinaceæ* and *Olacaceæ*, a subject thoroughly investigated by me many years since. The former group was first established by Mr. Bentham, twenty-four years ago, as a tribe of the latter family, but at that time, as little was known concerning either of them, this was accepted as a satisfactory arrangement. In 1851, after a long and careful study of the plants of these two groups, I arrived at a very

different conclusion, giving my reasons at considerable length, founded upon the evidence obtained by an extensive series of careful analyses; a copious diagnosis was given of each genus of the *Icacinaceæ*, their several structures were illustrated by analytical drawings, and with the view of showing the contrast, the same course was followed in demonstration of a few genera of the *Olacaceæ*.

This evidence showed that the *Olacaceæ* (excluding *Icacineæ*) present a normal carpellary structure much resembling that of the *Styraceæ* (excluding *Symplocineæ*), a family also monographed and illustrated by me in a similar manner; it proved also that the group of the *Icacinaceæ* holds an intimate relationship with *Aquifoliaceæ* and *Celastraceæ*. In fine, it became evident that the only character in common between *Olacaceæ* and *Icacinaceæ* is the valvate æstivation of the corolla, a feature of very secondary value, compared with the more important consideration of its carpellary arrangement; in all other respects there is an absolute antagonism between the two groups, as I will here endeavour to recapitulate in as brief a manner as possible.

In *Icacinaceæ*, as in *Aquifoliaceæ* and other families of the Celastral alliance, the flowers are always symmetrical, the parts being equal in number and alternate in distinct whorls, viz. a cupular 5-toothed calyx (that never enlarges or becomes connate with the fruit), 5 petals alternate with its teeth, 5 free stamens always antheriferous, arising *outside* and *beneath* a free cupular disk, in which a free ovary, sometimes sterile, is seated; the stamens may therefore be said to be hypogynous, which is not the case in *Olacaceæ*. Of the ovary itself we will speak presently.

On the other hand, in *Olacaceæ*, the floral structure is quite of another character. Here the cupular disk performs a conspicuous part, and is subject to two conditions; either it is adnate to the calyx, or it is confluent for its entire length with the base of the ovary, but in either case both the petals and stamens stand *upon the margin* of the disk, so that these parts which constitute three distinct whorls in *Icacinaceæ*, form only a single whorl in *Olacaceæ*, and not only so, but there is no symmetry in the number of petals and stamens. The stamens are usually 6, seldom 4, and more rarely 5, varying in number among the species of each genus; many of them are deficient of anthers, and are united together in various ways, there being a constant tendency in these parts to become confluent, which never occurs

in *Icacinaceæ*. The stamens usually exceed the number of petals, and when several sterile ones are present, the fertile stamens stand *opposite* the petals, the sterile filaments being indiscriminately or only partially opposite or alternate with them. In *Ximenia*, *Heisteria*, and *Endusa*, which have 8–10 fertile stamens, 4 or 5 are opposite to that number of petals; in *Opilia*, *Strombosia*, *Anacolosa*, *Cathedra*, *Quinchimalium*, *Arjoona*, and *Myoschilus*,* which have only 5 or 6 fertile stamens, they are all *opposite* to as many petals; in *Schöpfia*, where the petals are more than half gamopetalous, the stamens stand *opposite* to the segments of the tube; in *Agonandra* the fertile stamens are *opposite* the petals, and the sterile stamens alternate with them. *Ptychopetalum* and *Athesiandra* (the latter appearing to me a good and distinct genus) have 8 or 9 fertile stamens, three of them being immediately *opposite*, the rest indiscriminately face the sides of the petals. In *Aptandra* the stamens are monadelphous, the filaments being united into a long cylindrical tube. From these facts it will be seen that as regards the position of the petals, the number, quality, insertion, or position of the stamens, there is an absolute want of any analogy between *Olacaceæ* and *Icacinaceæ*.

It has already been stated that the calyx in *Icacinaceæ* remains constantly unchanged, but in *Olacaceæ* it is far otherwise. In *Olax* and *Heisteria*, where it is free from the disk, it enlarges with the fruit, and in the form of a lax membranaceous covering, it encloses the fleshy drupe in a greater or less degree. In *Liriosma* it also increases considerably, but it becomes confluent with the fruit, which thus assumes the appearance of an inferior drupe. In *Cathedra* it becomes multiplied by fresh developments, so that the fruit is found seated within 3 or 4 concentric cups around the free persistent disk. In most other cases, the disk being confluent with the ovary, it thickens and enlarges with it, converting it into an apparently inferior drupe, some-

* The last three genera are generally placed in *Santalaceæ*, but they appear to me truly *Olacaceous*, having a distinct whorl analogous to a calyx, which is either free or adnate to the disk upon which the petals are seated, and which is wanting in *Santalaceæ*. Many botanists deny to this whorl the name of calyx; Brown called it a calycule, analogous to the similar whorl in *Proteaceæ* and *Loranthaceæ*; it is named a calycode by Planchon and Decaisne, but whether it be calyx or calycode, it only amounts to a difference in the extent of its development, the limit between which it is impossible to define, and I have therefore always considered it as a calyx. *Santalaceæ* cannot be far separated from *Olacaceæ*, although the prevailing system of classification, founded on the condition of the calyx, unnaturally places them widely apart.

what resembling that of *Liriosma*. Of these varied conditions in the development of the calyx, we find no parallel in *Icacinaceæ*.

There is much to remark in regard to the development of the ovary and seed. In *Icacinaceæ*, the ovarium in most of its genera is 1-locular, but it is only so by the early abortion of its other cells, as its gibbous form sufficiently indicates. This is manifested in *Pennantia*, where the ovary, from this cause, is sometimes 1-locular, but at other times it is distinctly 2-locular, with a complete dissepiment, having a placentary line in the axis communicating with the style and with the base of the cell, and along which the nutrimentary and fecundating vessels pass in opposite directions, meeting at a point a little below the summit of the dissepiment, from which 2 nearly collateral ovules are suspended in each cell, precisely in the same position as when it is unilocular; invariably only a single seed is perfected in each cell. When the ovary is 1-locular, we may easily trace the same line of vessels, together with the vestiges of the abortive cells, along the wall of the ovary, which is consequently thickened in that direction. In *Emmotum*, as Mr. Bentham himself showed many years ago, the ovary at the time of flowering is completely 5-locular, and sometimes has a perfect seed in each cell at maturity, though more generally 3 or 4 of the cells become abortive. This direct connection of the style with the placentæ, through the medium of an axile line of vessels in *Icacinaceæ*, is in conformity with the usual organization in Phanerogamous plants.

But the *Olacaceæ*, together with *Styraceæ*, *Santalaceæ*, and a few other families, form an exception to this general rule, the normal construction of their carpels being fundamentally of an opposite character. In *Olacaceæ* the ovary is constantly 1-locular in its upper portion, and is either continuously so to the base, or it is there divided into 2, 3, or 4 short basal pouches, formed by as many very short rudimentary dissepiments, which gradually vanish upwards into as many carinated or nerve-like projections along the wall of the cell; these pseudo-dissepiments are united at the base upon a placentary column, which rises in the centre in the form of a short free cylinder, from whose summit a corresponding number of ovules are suspended, so that a single ovule hangs in the cavity of each pocket: in *Opilia*, which has no pseudo-dissepiment, there is only a single ovule suspended from the apex of the central column. I proposed some years ago to call this placentary column a cionosperm, and to unite all the families provided with this

kind of placentation, into one cohort, called *Cionospermales*. The chief distinctive character of this very natural group of families, is that owing to the want of connection between the style and placentæ there does not exist that direct line of fecundating vessels, which in ordinary cases descends straight from the stigma to the ovules, reaching the point where they meet the nourishing vessels coming from an opposite direction; here, on the contrary, the stigmatic channels for the conveyance of the pollen-tubes must either terminate at the base of the style, or must descend along the parietal nerves before described, so as to reach the base of the cell, and thence ascending the central column in company with the nourishing vessels, in order to arrive at the placentæ. This fundamental difference in the organization of the carpels, and in the mode of fecundation of the ovules, assuredly places the whole group in a distinct category.* It appears, therefore, a violation of the rules on which any natural system is founded, adopting as its basis the carpellary structure of plants, to unite in one family the "*Olacinieæ*" and "*Icacineæ*," which in their entire organization stand so diametrically opposed to one another.

But the whole of the case has not yet been stated, for there exists a still greater discrepancy in the structure of the seed. In *Icacinaceæ*, although only one seed is usually perfected, its development is precisely the same as that in the *Aquifoliaceæ*, and analogous to that of the *Celastraceæ*, where it differs only in its being erect, and often provided with an arillus. In all, the albuminous seed is enveloped in two distinct integuments, testa and tegmen, furnished with a basal chalaza, and with the dorsal raphe, which is peculiar to nearly all the genera of the Celastral alliance, and one of its most distinguishing features; the embryo, usually large, has a terete radicle pointing to the hilum, and large flat and foliaceous cotyledons.

In *Olacaceæ*, on the contrary, when we break the putamen, we find in its single seed an albumen quite naked, and impressed on one side with a distinct furrow; we find also adhering to the inner face of the putamen a very delicate membrane, without the smallest trace of either raphe or chalaza, but between it and the wall of the shell a free thread

* This structure must not be confounded with that observed in *Caryophyllaceæ* and *Pittosporaceæ*, where the ovary is normally, and at an early stage, completely plurilocular, but where, by the rupture and withering of the dissepiment, it becomes wholly or partially unilocular.

is seen, corresponding with the furrow in the albumen, which, rising from the base of the cell, ascends to near the summit, bearing on its extremity the remains of the abortive ovules. This is the cionosperm above mentioned, elongated and attenuated with the growth of the fruit; it is exactly the same as occurs in *Santalaceæ*, which has a similar albumen impressed with a longitudinal furrow on one side, a similar delicate solitary integument without chalaza or raphe, and a similar free external thread-like cionosperm. The embryo is also like that in *Santalaceæ*, and very different from that in *Icacinaceæ*.

It is therefore extremely unphilosophical to persist in uniting together, in one family, two groups of plants so utterly discordant in every respect. M. Baillon, in his admirable memoir on the *Loranthaceæ* (Adansonia, iii. 85), fully agrees in this opinion, especially as regards the position of *Icacinaceæ* in the Celastral cohort. He enters fully into the nature of the structure of the *Olacaceæ* as being entirely opposed to that of *Icacinaceæ*, and maintains (l. c. p. 99) its intimate relationship with *Loranthaceæ*, and especially towards those genera having a free central placenta, such as "*Primulaceæ*, including *Ardisiaceæ*, *Theophrasteæ*, *Myrsinaceæ*, and *Ægiceraceæ*." The consideration of this affinity, pointed out by me many years ago, would lead us into too wide a digression from our present subject.

The authors of the new 'Genera Plantarum' omit all notice of the important fact of the constant occurrence of a dorsal raphe in the seminal integuments of the *Icacinaceæ*, a development which forms a strong connecting link between that family and others of the Celastral alliance. There is indeed so close an approximation between *Icacinaceæ* and *Aquifoliaceæ*, that wherever the one is located the other must necessarily accompany it, for the only material difference between them is a contrary mode of æstivation. The occurrence of a dorsal raphe I believe to be universal throughout the *Celastraceæ*, *Hippocrataceæ*, *Aquifoliaceæ*, and *Icacinaceæ*, and to be almost peculiar to them: this combined with a marked uniformity in their floral and carpological features, consolidates them into one very natural cohort. The line of demarcation between them is shown by the following simple rule, against which I do not remember a single exception.

A. Stamens inserted within the disk.

Ovules erect, with a dorsal raphe. Petals imbricated . . *Hippocrataceæ*.

B. Stamens inserted outside the disk.

Ovules erect, with a dorsal raphe. Petals imbricated . .	*Celastraceæ.*
Ovules suspended, with a dorsal raphe. Petals imbricated .	*Aquifoliaceæ.*
Ovules suspended, with a dorsal raphe. Petals valvate . .	*Icacinaceæ.*

This group (*Celastrales*) marked with the above prominent character might constitute the first of three sections into which the class *Frangulaceæ* of Endlicher may be divided; the second section would consist of the *Rhamnales*, distinguished by another and still more peculiar development of the raphe; while the third would comprise such Orders as possess the ordinary ventral raphe, the stamens inserted inside or outside the disk, and erect or suspended ovules, such as *Staphyleaceæ*, *Chailletiaceæ*, *Goupiaceæ*, and others. It was under this view that I suggested, some time ago, to make *Goupia* the type of a distinct family, as it differs from all the *Celastrales* in having a ventral raphe, but otherwise agreeing with *Hippocrataceæ* in the insertion of its stamens inside of a bell-shaped disk. *Goupia* is certainly misplaced among the *Celastraceæ* in the 'Genera Plantarum,' essentially differing in the position of its stamens.

It is manifest that *Villaresia*, from its organization, cannot be referred to *Olacaceæ*, nor yet to *Icacinaceæ*, on account of the æstivation of its petals; the genus consequently falls into *Aquifoliaceæ*, as I showed long ago, differing from other genera of the family in the number of cells in its ovary. By referring to my diagnosis of the genus (Ann. Nat. Hist. 3rd ser. ix. 110) it will be seen to tally with every character which the authors of the 'Genera Plantarum' assign to *Aquifoliaceæ*.

While on this subject, I will offer a remark concerning *Bursinopetalum*, which Dr. Seemann in this 'Journal' for July last (p. 205), refers to *Cornaceæ*, in which opinion he is in accord with the authors of the 'Genera Plantarum.' I had previously endeavoured to show that the genus does not belong to *Araliaceæ*, where it had been assigned, but impressed by the singular resemblance in the structure of its seed to that of *Villaresia*, especially as it agreed in the dorsal position of its prominent raphe, according also in the number and position of its stamens and petals, the apical inflection of the latter, and their subimbricate æstivation, I was induced to suggest its affinity to it; indeed, excepting its inferior fruit, there is nothing to prevent the genus ranging by the side of *Villaresia*. In regard to this exception, I observed that

at an early stage the cell of the ovary in *Bursinopetalum* stands above the line of the insertion of the stamens, and that it is owing to the subsequent downward growth, that it becomes inferior in the fruit. I cited the instance of *Halesia*, where the ovary in the first instance is in like manner superior, but where, from a similar cause, the fruit is rendered inferior; but no one for this reason would separate *Halesia* from *Styraceæ*. The two cases are quite parallel, and favour the view then suggested. In regard to the position of the genus in *Cornaceæ*, we have yet no fact on record to show that any of its genera possess a dorsal raphe; the only evidence on this subject is that furnished by Mr. B. Clark (Kew Journ. Bot. v. 129, pl. 5), where the position of the raphe in *Cornaceæ* (*Cornus albus*) is shown to resemble that in *Alangiaceæ* (*Marlea*); these two Orders, hitherto placed widely apart, might perhaps with propriety be united, or at least approximated,* especially as, in both, the raphe is neither ventral nor dorsal, but singularly lateral, as in all the *Colletieæ*. The position of the raphe will be found a very useful index in the determination of plants, and notwithstanding it has been neglected or despised by botanists, it remains a character of much value, as it indicates a fundamental difference in the development of the ovules, resulting probably from some unknown modification in the origin of the carpels; it shows that in all the Celastral group of families, the ovules, whether erect or suspended, have a peculiar mode of origin, which I have called hypopylar, to distinguish it from the epipylar development, which usually occurs in Phanerogamous plants.†

M. Baillon (l. c. 99) objects, with great reason, to the doctrine of the authors of the new 'Genera Plantarum,' enounced in p. 342, that "the *Cornaceæ* differ from the *Olacineæ* only by their inferior ovary." We must infer that they had only their tribe *Icacinieæ* in view in that declaration, for we can hardly believe they could possibly include *Olacaceæ* proper in the same category. Upon this opinion regarding

* This identity was long ago shown by Mr. Bennett, in describing *Polyosma* (Fl. Jav. var. 194), the affinity between *Cornus* and *Marlea* having been first pointed out by Mr. Rob. Brown (Abel. Narr. 374). The reasons assigned by Mr. Bennett for the union of *Cornaceæ* and *Alangiaceæ* appear to me sufficiently convincing. Dr. Seemann (Bot. Herald, p. 381) and Mr. Bentham ('Flora of Hongkong,' p. 137) also class *Marlea* (*Diacæcarpium*, Hassk. in Bonplandia, vii. 172) with *Cornaceæ*. Bartling ('Ordines Plantarum,' 1830, p. 238) combines *Cornus*, *Marlea*, and *Hedera*, into a separate Order, which he calls *Hederaceæ*.

† See my remarks on the development of the ovule, Ann. Nat. Hist. ser. 3, iv. 24; Contrib. Bot. i. 120.

Cornaceæ, M. Baillon observes, that "the ovary in *Cornus mascula* is not more inferior than that of *Codonium (Schöpfia) Mexicanum*;" this is quite true, but as before remarked of other parallel cases in *Olacaceæ*, the fruit of *Schöpfia* becomes inferior only by the subsequent adhesion of the calyx to the enveloping disk on which the stamens and petals are seated, and by the downward growth of the ovarium, which at an early stage is superior, as in *Bursinopetalum* and *Halesia*. Too much importance has probably been attached by botanists to the distinctions of an inferior or superior ovary, without regard to the cause. Numerous facts of this nature show that the condition of the calyx, often subject to such extreme morphological changes, is ill calculated to remain the principal basis of any systematic arrangement of plants, and they prove the little value that can be attached to the distinctions of *Thalamiflorœ*, *Disciflorœ*, and *Calyciflorœ* as exact primary divisions. Another element has also been disregarded, and perplexity created by confounding a large epigynous gland with a true disk; little notice has been taken of the part which the gland and the disk exert in the progressive stages of growth.

When describing *Villaresia* two years ago, I mentioned having found a cultivated species with a 2-locular ovary. This occurs constantly in the species here described, where it will be seen that the disk is larger than usual, while its development in other species is small. In *Aquifoliaceæ* and *Icacinaceæ*, when the ovary is fertile, the disk is but little developed, but when it is sterile, it is more conspicuous; in the species under consideration, where the flowers are perfectly hermaphrodite, the disk is of considerable size. In both families the flowers are more or less polygamous, that is to say, subject to a partial depauperation of the stamens or ovary. In *Ilex*, among the ovaries that do not become fertilized, we find a distinct style, but when they are quite fertile, the stigma becomes almost sessile. I have an undescribed genus from Peru (*Dapsilantha*), in which the flowers are all completely unisexual, having 5 very imbricated petals, 5 perfect alternate stamens inserted outside of an unusually large disk, in the middle of which no rudiment of an ovary can be observed; in other respects the flower is quite that of an *Ilex* or *Villaresia*, with a dichotomously expanded inflorescence, as in the following, which forms the ninth species of the genus.

9. *Villaresia dichotoma*, n. sp.; ramulis teretibus, angulato-striatis, cortice brunneo longitudinaliter rimoso; foliis ovatis, utrinque breviter

acutis, acumine obtusiusculo, marginibus serrato-dentatis et undulatis, dentibus subglanduliferis interdum obsoletis, utrinque glaberrimis, firmiusculis, utrinque viridibus, subreticulatis, nervis plurimis teneribus venisque paulo prominulis; petiolo tenui, canaliculato, limbo ter breviore; paniculis binis, axillaribus, glaberrimis, petiolo paulo longioribus, latissime, laxe, et breviter divaricato-divisis, sinibus bracteolatis; floribus terminalibus, pedicellatis, parvulis, polygamis; ovario compresso, 2-loculari; stylo brevissimo; stigmate 2-lobo.—In Prov. San Paulo Brasiliæ; v. s. in Herb. Soc. Hort. Reg. (prope Itù, Weir, 116).

This is a shrub or small tree, found scattered over the hills a few leagues to the S.W. of Itù. The internodes are about $\frac{3}{4}$ inch long, the leaves $2\frac{1}{2}$–3 inches long, $1\frac{3}{4}$–$2\frac{1}{4}$ inches broad, on a petiole $\frac{3}{4}$ inch long; the peculiar annular glands are inconspicuous and smaller than in the other species, being more upon the veins than in the axils of the nervures. The racemes are about 1 inch long, expanding to a breadth of $1\frac{1}{2}$ inch, the main peduncle 3 lines long, is 4 or 5 times bifurcated, with very minute bracts in each sinus; the branches each $1\frac{1}{2}$ line long; the flowers on short pedicels, form the ultimate branches; each flower expanded is about 1 line in diameter; the 5 petals are oblong, rotate, with ciliated margins, and imbricated in æstivation; the 5 alternate spreading stamens are inserted beneath the margin of the pateriform 5-lobed disk; the fertile ovary is much compressed, 2-celled, with 2 ovules in each cell, nearly collateral, and suspended from a point about a quarter below the summit of the dissepiment; in some of the flowers the ovary is completely sterile, when it is very depressed and umbonated, wanting the stigma.

Description of Plate XXI., representing *Villaresia dichotoma* (natural size).—Fig. 1 is a flower expanded, seen from above. Fig. 2 is the calyx viewed sideways. Fig. 3 is a fertile ovary seated within the disk and calyx. Fig. 4 is a sterile ovary within the disk and calyx. Fig. 5. A petal:—*all equally magnified.* Fig. 6. Three of the stamens seen in different positions. Fig. 7 shows the mode of insertion of the stamens, beneath and outside the disk, with a fertile ovary in the centre, the sepals and petals being removed; (by an oversight a circle has been drawn round the stigma, which has rendered it indistinct). Fig. 8. The ovary surmounted by the style and stigma, seen sideways, to show its compressed form. Fig. 9. A longitudinal section of the same, through its broader diameter. Fig. 10. A horizontal section of the ovary:—*all more magnified.*

ROSA BAKERI, Dèsègl. mss.

Par M. A. Dèsèglise.

Rosa Bakeri, Dèsègl. sp. n.—Rosa tomentella, *Baker, North Yorkshire, p.* 229, *non Leman.* Arbrisseau à tiges de 7 à 8 pieds anglais de haut, arquées et munies de courts rameaux. Aiguillons uniformes, dilatés à la base, comprimés, moins robustes que ceux de *R. canina*, longs d'environ $\frac{3}{8}$ de pouce anglais, recourbés seulement à une petite distance de leur sommet ; ceux du sommet des rameaux beaucoup plus petites, grêles, dilatés en forme de disque à leur base, ordinairement droits ; aiguillons des jeunes pousses en faulx d'une couleur rouge-pourpre, brillante du côté exposé à la lumière. Pétioles velus à villosité courte abondante, parsemés de glandes fines stipitées plus ou moins abondantes, canaliculés en dessus, *inermes ou quelques-uns portant des aiguillons fins subulés blanchâtres* en dessous. Folioles 5–7, toutes pétiolées, la terminale ordinairement elliptique ; les feuilles terminales entourant les fleurs longues d'un pouce et quart ou demi sur $\frac{7}{8}$ de pouce anglais de largeur, pas plus grandes que les autres ; les folioles sont *ovales* ou *elliptiques, d'autrefois rétrécies au-dessous de milieu et deviennent obovales*, d'un *vert foncé* en dessus, quelque peu rugueuses, *couvertes* de quelques poils apprimés à la surface supérieure dans le jeune âge, *glabres* à l'époque de leur développement parfait ; *velues en dessous à villosité courte apprimée peu abondante*, glanduleuses sur la nervure médiane et sur les bords *à glandes fines éparses et peu nombreuses : profondément* et doublement dentées à dents ouvertes, aussi larges que longues, à bords ciliés-glanduleux. Stipules lancéolées, glabres en dessus, pubérulentes et glanduleuses en dessous à oreillettes aiguës denticulées, *droites ou un peu divergentes*, à bords ciliées et glanduleuses. Pédoncules solitaires ou triflores, *très-courts*, au point que les dernières feuilles avec leurs larges stipules dilatées sont souvent plus longs que les fleurs et les cachant à moitié, *lisses ou portant quelques rares petites glandes avortées*, munis à leur base d'une petite bractée ovale cuspidée, glabre en dessus, légèrement velue en dessous, plus longue que les pédoncules. Divisions du calice 2 entières, spathulées au sommet, tomenteuses aux bords et en dessous, 3 pinnatifides terminées en pointe foliacée et velue, parsemées de glandes fines en dessous excepté à leur base, à appendices lancéolés bordés de glandes

fines stipitées, toutes tomenteuses en dedans ; les plus grandes divisions sont longues de $\frac{3}{4}$ de pouce à un pouce anglais, saillantes sur le bouton, *égalant* presque les pétales, réfléchies à l'anthèse, puis *droites écartées sur le fruit et persistantes jusqu'à le fruit devienne rouge en septembre* et tombent qu'il soit parfaitement mûr ; tube du calice ovoïde, glabre. Styles libres, courts, *obscurement hérissés ou glabres ;* disque non saillant. Pétales entièrement roses, obovés-cunéiformes, longs à $\frac{7}{8}$ de pouce anglais sur $\frac{3}{4}$ de largeur, ondulés sur les bords, les fleurs pleinement développées ont un pouce et demi (anglais) de largeur. Fruit mediocre, rouge, ovoïde ou ellipsoïde.

Hab. Les haies près de Thirsk, comté Nord d'York (*Baker !*). Description faite sur les échantillons et les notes communiquées par M. J.-G. Baker.

Obs. Cette plante par les glandes que les feuilles portent à la face inférieure appartient à ma section *Rubiginosæ*. Je la crois nouvelle, ne voyant pas dans mon herbier ni parmi les ouvrages en ma possession à quoi la rapporter. Chose certaine, ce n'est pas le *R. tomentella*, Leman. Le rosier d'Angleterre diffère du *R. tomentella*, Leman, par sa taille plus élevée, ses aiguillons plus faibles, ses folioles beaucoup plus grandes non obtuses, à dents plus fortes, ses pétioles faiblement aiguillonnées, ses stipules lancéolées glanduleuses à oreillettes presque droites, ses pédoncules beaucoup plus courts, ses divisions calicinales, ses styles presque glabres, ses fleurs plus grandes ; du *R. Blondæana*, Ripart, par ses aiguillons plus faibles, ses pétioles velus glanduleux, non-seulement chargés de glandes, ses folioles velues dans le jeune âge à la face supérieure et velues en dessous, non glabres, ovales-cuspidées ou ovales-obtuses, ses stipules velues et glanduleuses en dessous, ses pédoncules très-courts glabres, le tube du calice glabre, ses styles glabres, ses fleurs roses; ses divisions calicinales atteignant presque les pétales, son fruit beaucoup plus petit ; du *R. viscida*, Puget, par ses tiges arquées, ses aiguillons moins nombreux et plus faibles, ses pétioles velus glanduleux, ses folioles non glabres en dessus, glaucescentes glanduleuses en dessous, ses pédoncules glabres, le tube du calice glabre, ses fleurs plus grandes, son fruit non hispide, d'un rouge violacé à la maturité ; du *R. fœtida*, Bastard, (les échantillons ont l'aspect de la plante de Bastard, mais différents de l'espèce française !) par n'exhalant pas par le froissement une légère odeur de térébinthine, ses folioles moins chargées de glandes, ses pédoncules très-courts, glabres, non longs, hispides glanduleux, le tube du

calice glabre non hispide, ses divisions calicinales beaucoup moins glanduleuses, ses fleurs roses, son fruit d'un beau rouge. Votre plante est totalement différente des groupes du *R. sepium*, Thuill., et *R. rubiginosa*, L., et ne peut pas être comparée avec ces espèces. Par les feuilles parsemées de glandes en dessous il s'éloigne du *Caninæ* à feuilles velues ; il est aussi bien différente du *R. mollissima*, Fries ! La vraie place de l'espèce anglaise est, selon moi, dans la section *Rubiginosæ*, à côté du *R. fœtida*, Bastard.

ON THE NORMAL STRUCTURE OF CRUCIFEROUS FLOWERS.

By W. G. Smith, Esq.

In stating my views on the normal structure of the floral organs of *Cruciferæ*, it may not be out of place to show how I arrived at them.

If we take a flower of the genus *Cheiranthus* (Fig. 1), carefully note the arrangement of the stamens, glands, etc., and assume that

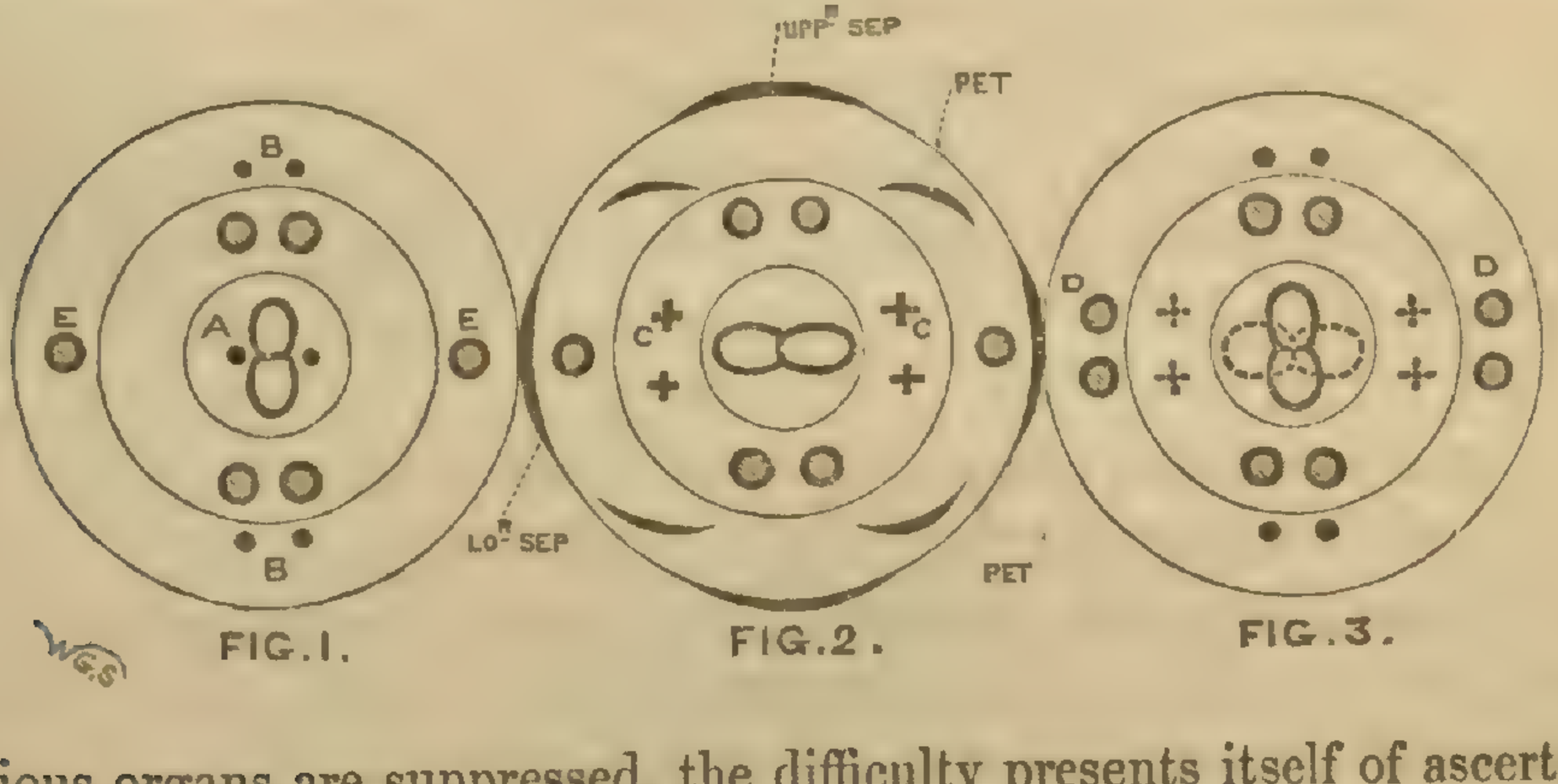


FIG. 1. FIG. 2. FIG. 3.

various organs are suppressed, the difficulty presents itself of ascertaining whether the gland-like bodies represent the elementary conditions of pod-cells, stamens, or petals. The question then naturally arises as to whether there may be any other genus of *Cruciferæ*, where these arrangements are *reversed*—where organs suppressed in one are developed in another, and *vice versâ*. The unusual petal-form of the genus *Iberis* prompted me to examine *Iberis amara* (Fig. 2), and I was fully repaid for my pains. It was manifest that whilst the two pod-cells were in

the same line as the four long stamens in *Cheiranthus*, they were in the direction of the two short ones in *Iberis*. If we then assume the longitudinal cells suppressed in *Cheiranthus*, and the transverse ones developed, and the longitudinal cells of *Iberis* developed, and the transverse suppressed by supplying the missing cells of *Cheiranthus* from *Iberis*, we get a 4-celled pod (Fig. 3),—without doubt the normal condition of the fruit of *Cruciferæ*, as in *Tetrapoma pyriforme*, Seem. Botany Herald, t. 2. Somewhat in proof of this the two missing cells of *Cheiranthus* are indicated by two small gland-like bodies at the base of the pod, and between the two fully-developed cells (A, Fig. 1, and K, Fig. 4). Now that the 4 cells of the pod are arrived at, indications of the normal number of stamens is to be ascertained; of course the six stamens are altogether out of the question.

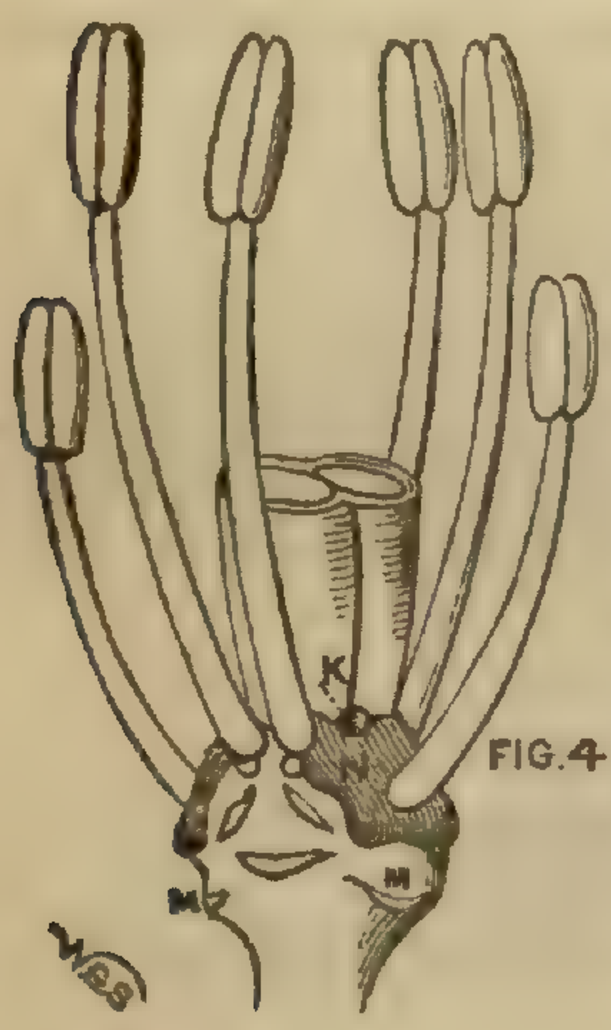


FIG. 4

The usual number of stamens found in *Cruciferæ* is six—two pairs with long, and two single stamens with short filaments, the shorter ones further removed from the pistil, or making part of a second whorl. But if a large number of flowers are examined, it will be observed that it is not at all unusual, or very rare, for the short stamens to occur in pairs also (D,D, Fig. 3), or with one short stamen on one side, and a *pair* of short ones on the other. I therefore assume provisionally that the number may be put down as eight, two pairs of long and two pairs of short in two whorls. The only difference this makes as to whether the short stamens are assumed to grow singly or in pairs is, that the number will range between 14 and 16, according to whether the two extra stamens are absent or present, but I believe the ultimate number to be 16. This agrees, in the most remarkable manner, with the East Indian *Megacarpæa polyandra*, Benth. in Kew Journ. vii. t. 7 and 8.*

* Mr. Bentham, after giving the history of this remarkable plant, its discovery by Strachey and Winterbottom in the Himalayas, its introduction by Col. Madden to Glasnevin, and its distribution of fresh specimens by Dr. Moore to various botanists, coutinues:—"Both Dr. Hooker and myself took the opportunity of examining a considerable number of buds in various stages of development, as well as expanded flowers, but again failed in detecting any regularity or symmetry in the arrangement, even when the number of stamens, twelve or sixteen, was an exact multiple of that of the petals or sepals. Dr. Lindley indeed believed he had found traces of an arrangement in two distinct series, each double in number to that of

The result can be easily arrived at in the following manner:—The glands in *Cheiranthus* are six, in *Iberis* only four in number.

Two of the glands of *Cheiranthus*, as before stated, are situated at the base of the pod and between the cells. Without doubt, then, these two extra glands represent the two absent cells of the pod (A, Fig. 1, and Fig. 4). This will reduce the glands to four each, and were they situated in the same places in both genera, only ten stamens could be arrived at. But it is not so. In *Cheiranthus* the undeveloped stamens are *outside* the two pairs of long stamens (B,B, Fig. 1), and in *Iberis* they are *inside* the two short stamens (C,C, Fig. 2).

We may now reasonably infer that the two pairs of longitudinal glands are wholly suppressed in *Cheiranthus* (Fig. 1), but developed in *Iberis* (Fig. 2 at C,C), whilst the transverse glands do not occur in *Iberis*, but are present in *Cheiranthus* at B,B, Fig. 1. This is simply applying the same rule to the stamens that is applied to the cells of the pod, and by supplying from one genus the organs that are deficient in the other, and *vice versâ*, we get a 4-celled pod, and sixteen stamens in two whorls of eight each, as in Fig. 3.* I may add that by longitudinal is meant the greater width of the flower-plan from one single short stamen to the other; by transverse, the lesser width, or from one pair of long stamens to the opposite pair.

There are four other points in Cruciferous flowers that may be called

the petals and sepals; and Colonel Madden, in his description of the plant (Proceedings Bot. Soc. Edinb. 1855, p. 43), says that the stamens are 'disposed in two or four sets.' But upon a careful re-examination of a number of flowers, I cannot discover any such arrangement. The stamens, especially when numerous (never however more than sixteen in any flower I have opened), are crowded into a tuft surrounding the ovary, so that some three or four appear to be external, sometimes one opposite a petal, sometimes two side by side, but they are so dense that one can never say that two are nearer together than to the adjoining ones, and no one is really withinside another *at the base*. When the stamens are detached (and they fall off with the greatest facility when fresh), their scars form a single, *irregularly* waved line, at some distance from the ovary, and surrounded by a slightly glandular ring, waved and indented by the cavity left by each filament. This arrangement is particularly evident after the flower is fully expanded, and the filaments have more room to assume their natural position. To me therefore it is clear that the whole of the stamens belong, in this as in other *Cruciferæ*, to a single verticil. This view of the case would tend to confirm the most plausible of the modern theories of the morphology of *Cruciferæ*,—that one so clearly expounded by Messrs. Webb and Moquin-Tandon in the seventh volume of 'Hooker's Journal of Botany,' and almost simultaneously by Dr. Asa Gray, in the first volume of his beautiful 'Illustrations of the Genera of North American Plants.'" (Hook. Journ. Bot. vii. pp. 353, 354.)

* In *Selenia aurea*, Nutt., the calyx is nearly equal at the base, and there are 10 glands, 8 by pairs at the base of the sepals, and 2 (emarginate) at the base of the shorter stamens. (Torrey and Gray, Fl. N. Am. i. 99.)

at least peculiar. 1st. The oblong plan of calyx. 2nd. The oblong plan of petals the reverse way to calyx. 3rd. Two sepals of the calyx higher on the stem than the other two; and 4th. The curious receptacle on which the smaller stamens grow. They can all be easily explained in the following manner:—

1st. As the single stamens are further removed from the ovary than the two pairs are, room must necessarily be made for the bases of these two stamens (E,E, Fig. 1), hence the oblong plan of calyx this way.

2nd. For the same reason, viz. that these stamens are so far from the ovary, they push between the pairs of petals and elongate the petal-plan the other way.

3rd. One pair of sepals are higher on the stem than the other pair, because the two odd stamens form a second whorl, that are lower on the receptacle than the pairs, therefore these two odd stamens push down two sepals (M,M, Fig. 4).

4th. The curious receptacle of the odd stamens (N, Fig. 4). In *Megacarpæa polyandra*, there is a receptacle all round the bases of the stamens. Therefore I suppose normally in all *Cruciferæ* there is a receptacle at the base of the second whorl, but as the second whorl of stamens is incomplete in nearly all the *Cruciferæ*, the receptacle is incomplete also. I look therefore upon these appendages at the bases of the odd stamens as imperfect remains of a receptacle that should go all round, but is partially suppressed, in the same manner as the stamens of the second whorl are suppressed.

CONJUGATIONS OF DIATOMEÆ.

By H. J. Carter, F.R.S.

During the first half of the last month (July, 1864), I have found three species of *Diatomeæ* in conjugation, viz. *Navicula serians*, Ktz., *N. rhomboides*, Ehrenb., and *Pinnularia gibba*, Ehrenb., all in heath-bog water in the neighbourhood of Budleigh-Salterton, on the south coast of Devonshire. All conjugate after the manner detailed and illustrated long since by others as well as myself, but here there are besides sporangeal frustule-cases, and these are ringed as first described by Dr. Griffith, and also rightly inferred by this naturalist to be siliceous, because they *do not* dissolve in nitric acid.

Having found *Navicula serians* in all its stages of conjugation, I can now add a little more to the detail of this process in the navicular *Diatomeæ*, viz. the contents of the two conjugating frustules after having passed into the usual spherical form of the sporangium, and then having undergone division into the two smaller spheres, each of the latter becomes elongated, separates in the equatorial line, and each hemisphere being carried out upon the ends of the contained sporangeal frustule-cases in a cap-like form, remains there, until these sporangeal cases attain their maximum development. *Pari passu*, the large frustule is produced within all, and ultimately a longitudinal fissure, extending throughout the frustule-case, gives exit to it by this kind of dehiscence.

Besides the three conjugations in the three different species mentioned, I have found a fourth, but this is merely one of a smaller size of *N. rhomboides*; thence I may state that I have found four navicular conjugations, and, if time had permitted, I think I might have found more,—perhaps I may do so on a future occasion.

But the finding of two different sizes of *N. rhomboides* in conjugation, seems to throw some light on the object of this conjugating process in the *Diatomeæ*, and if here, why not generally on conjugating processes of this kind?

Thus, the conjugating frustules of the smallest size of *N. rhomboides* produced frustules of exactly the same size as the conjugating ones which produced the largest size of the same species.

Hence it may be inferred, that the result of these conjugations by such repetition, is to bring the size of the frustule from its embryonal state up to that of its maximum development.

After this has been attained, it appears to me that germ-cells are produced in the interior of the fully developed frustule, which become impregnated by sperm-cells, generated in the interior of the nucleus, as I have suggested in the freshwater *Rhizopoda*. The germ-cells may or may not come from what I have called the "glair-cell" in the navicular *Diatomeæ*, etc.

But, should this be the case, then the result of the conjugation will be to bring the frustule up to the size of maturity (from which process arises the great diversity of size in frustules of the same species), and the development of the germ- and sperm-cells, with their impregnation, thus to complete the generative cycle in the *Diatomeæ*.

REVISION OF THE GENUS *NAJAS* OF LINNÆUS.

By Alexander Braun, Ph.D.,

Professor of Botany in the University of Berlin.

In May last I received specimens of a *Chara*, collected March 6, 1864, by Dr. Seemann, in the Dutch Island of Curaçao, West Indies, and in the only freshwater spring of that colony, which rises at the foot of the famous stalactite caves of El Hato. This *Chara* proved to be a form of *C. polyphylla*, so widely diffused over both Americas, the East Indies, and New Holland, and has been named var. *Curassavica* by me. Intermixed with it was a *Najas*, which, fragmentary as it was, proved sufficient for determination. A comparison of this with other forms of *Najas* led me further and further, until I exhausted all the materials existing in the Berlin herbaria, the herbarium of Dr. Sonder of Hamburg, and the East Indian one kindly communicated by Professor Miquel. The result of my examination has led to satisfactory results with respect to the definition of species, not to mention those relating to the vegetation, phyllotaxis, and ramification of the *Najades*, hitherto but imperfectly understood.

The most important characters for the definition of species reside in the sheathing base of the leaves, as shown in the following sketch.

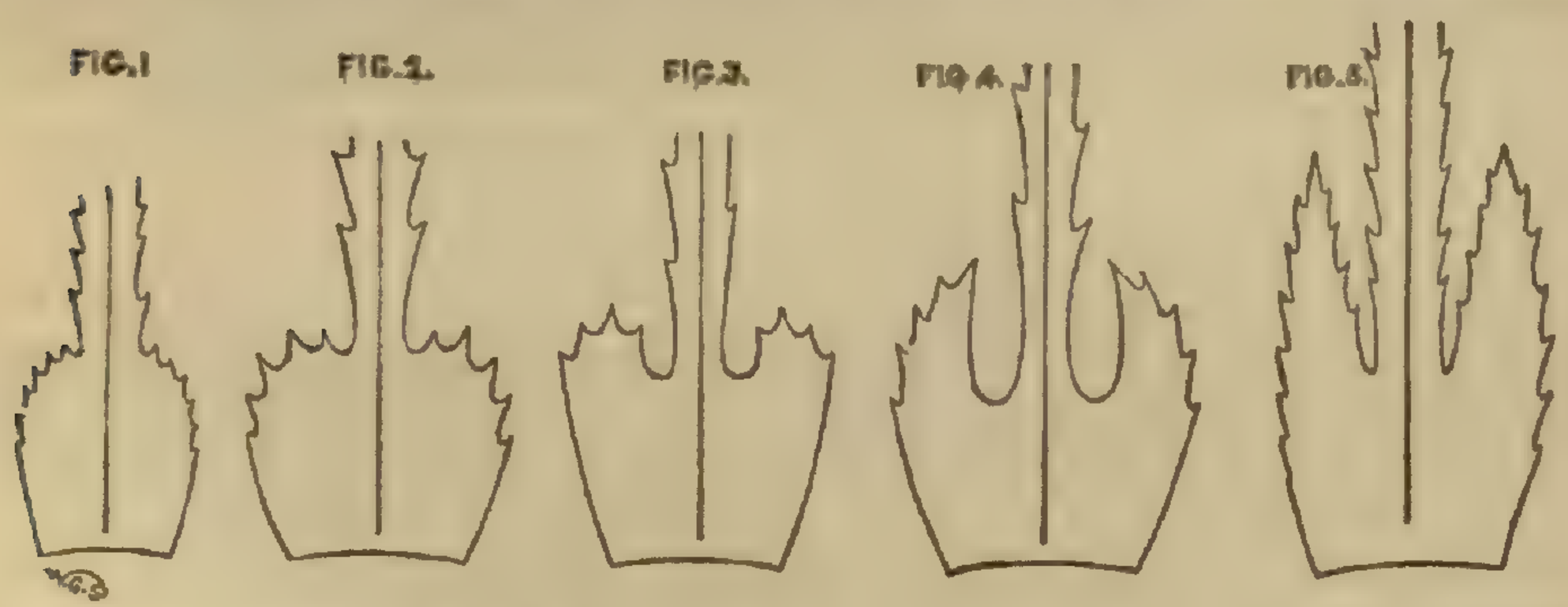
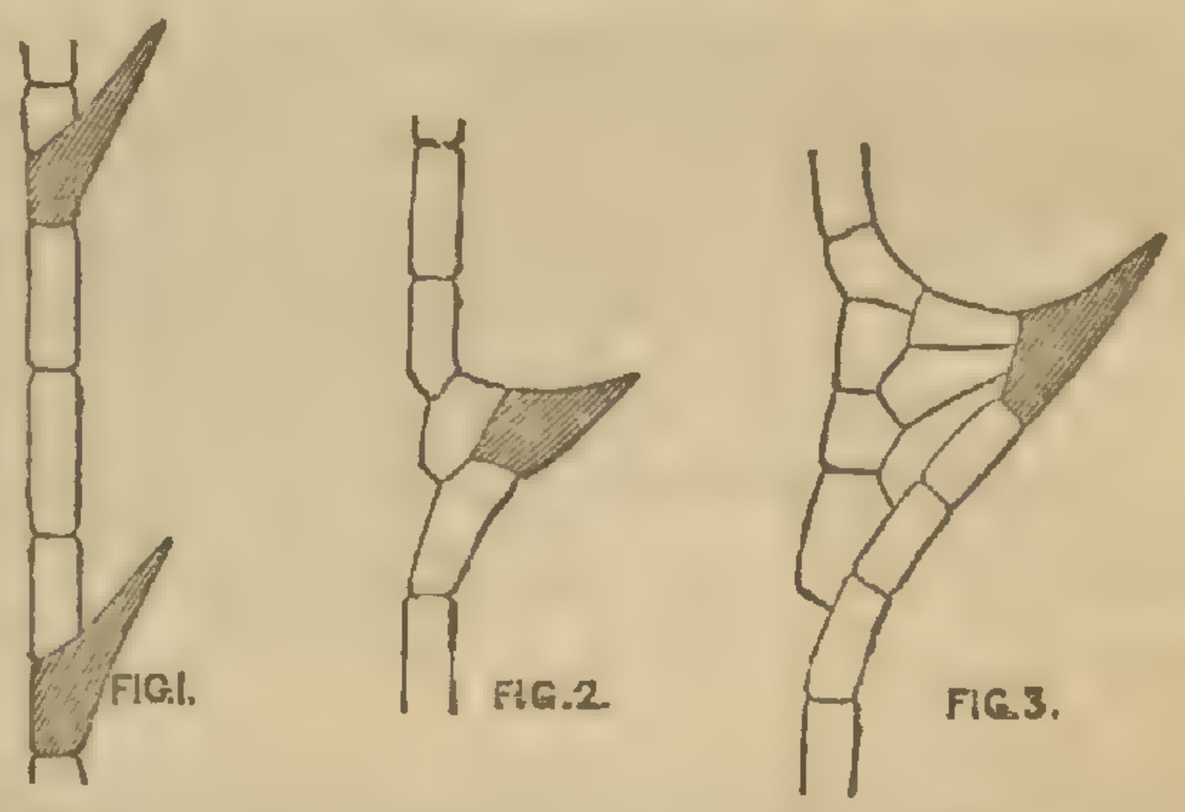


Fig. 1 refers to those of *N. flexilis*; fig. 2, to *N. minor*; fig. 3, to *N. minor*, var. *setacea*; fig. 4, to *N. falciculata*; and fig. 5, to *N. graminea*.

The teeth of the blade of the leaves, in regard to their greater or lesser prominence, also furnish good, though less important, characters. The point of each tooth, as shown in the second sketch, is always forme

by a spiny, acute, brownish-yellow cell. In *N. flexilis* (fig. 1) this prominence is formed of the spiny cell only, in *N. graminea* (fig. 2) by two, and in *N. minor* and *arguta* (fig. 3) several, additional cells.



NAJAS, *Linn.*

Sect. I. EUNAJAS.—Stem and back of leaves generally covered with minute spines; flowers (probably in all species) dioicous. (It remains still to be ascertained whether the anthers of all the species of this section are different from those of the second.)

1. *N. major*, All.; *N. marina*, Linn. *ex parte*. A polymorphous and widely-distributed species, the extreme forms of which would hardly be recognized as belonging to one and the same species. The normal form exhibits the following characters:—Stem sparingly beset with spines (10-40 in each internode); leaves broad-linear, each edge of the blade with 4-8 teeth, which are patent and not quite so long as the leaf is broad, the leaf at the back furnished with 1–4 spines; sheath of leaf with rounded lateral edges and without teeth; fruit 5–8 millimetres long.—Europe, Northern Asia, Florida (Cabanis!). Under the name of *N. marina*, Linnæus comprehended both *N. major* and *N. minor*; and it does not seem advisable, as the Swedish botanists have done, to retain the name *marina* for *N. major*, especially as that species is a plant found in fresh or only slightly-brackish water. I distinguish the following varieties:

β. *Ehrenbergii*, A. Braun. Differs from the normal form by its unarmed stem, and the edge of the sheath furnished with 1–2 teeth.—Arabia (Ehrenberg!).

γ. *angustifolia*, A. Braun. Stem almost unarmed; leaves long, narrow-linear, on each side of the margin with numerous (5–10) short teeth, turned outwards; sheath generally toothless.—Oahu, Sandwich Islands (v. Chamisso!), Bourbon (Herb. Kunth). Similar forms also found on the coast of Northern Germany.

δ. *multidentata*, A. Braun. Leaves on each side of the margin with 8–11 large and patent teeth, which are longer than the blade is broad; edge of the sheath with 2 or 3 teeth.—Italy (v. Martens!).

ε. *intermedia*, A. Braun.—N. intermedia, *Wolfgang (Gorski)*, *in Eichw. Nat. Skizze von Lithauen*, 1830. Leaves narrow-linear, on each side of the margin with 5–7 large teeth, which are generally longer than the blade is broad; sheath on each side with 1–4 teeth; fruit 3–4 millim. long.—Principally in the north and east of Europe.

ζ. *microcarpa*, A. Braun. Small and with short leaves; internodes of stem with few (5–10) spines; leaves on each side of the margin with 4–8 teeth as long as the blade is broad; sheath generally with only 1 tooth on each side; fruit only $2\frac{1}{2}$ millim. long.—Canary Islands (C. Bolle !)

η. *paucidentata*, A. Braun. Very small and with short leaves; internodes of stem with 1–3 spines on the upper portion; leaves with 1–3 teeth on each side of the margin; sheath with one tooth on each side; fruit 4 millim. long.—In South-eastern France (Duvernoy !).

2. *N. muricata*, Del. Stem thickly covered with spines (50–100 on each internode); leaves linear, on each side of the margin with 7–8 crowded patent teeth which are longer than the blade is broad, and on the back with generally 5 spines; sheaths with rounded edges, each with 2 teeth on the edge, and 1–3 spines on the back.—Egypt (Delile ! Ehrenberg ! Sieber !)

3. *N. latifolia*, Alex. Braun. Stems without spines; leaves broader than in *N. major*, linear-lanceolate, on each side of the margin with 12–16 short teeth, and on the back with 5–7 spines; sheaths rounded, without teeth.—In the Lake of Valencia, near Caracas (Gollner !).

Sect. II. Caulinia, *Willd.*—Stems and back of the leaves without spines; flowers (probably in all the species) monoicious.

4. *N. flexilis*, Rostkov. et Schmidt.—Caulinia flexilis, *Willd.* 1789. N. Canadensis, *Michx.* Leaves narrow-linear, smooth, on each side of the margin with 25–30 minute serratures, projecting beyond the edge formed of only one cell (that of the spiny point); edge of the sheaths but slightly projecting, obliquely rounded (see fig. 1 of first sketch); the upper portion toothed.—Pomerania (Rostkovius ! and others); Brandenburg (Mund ! Hertzsch !); Sweden; Ireland (Oliver !); Canada, and United States as far as Oregon (Lyall !); California (Chamisso !); Mexico (Schiede !, Schaffner !).—There are a number of allied forms which at present I shall enumerate as varieties, though future investigations may prove several of them to be distinct species.

β. *Guadalupensis*, A. Braun.—Caulinia Guadalupensis, *Sprengel.*

Spreading and much branched; the leaves shorter, undulate, on each side of the margin with about 20 teeth; the fruit rather shorter.—Guadeloupe (Duchassaing!); and similar forms from Texas (Lindheimer!) and Mexico (Mueller!).

γ. *Curassavica*, A. Braun. Leaves twice as broad as those of the normal form, smooth, on each side of the margin with 40 teeth.—Curaçao, at El Hato, growing with a peculiar form of *Chara polyphylla* (Seemann!). Allied forms from St. Domingo (Herb. Willdenow!), and Mexico (Schaffner!).

δ. *Gollmeriana*, A. Braun. Still larger and broader-leaved than the preceding; leaves on each side of the margin with 40–50 teeth.—Caracas (Gollmer!).

ε. *punctata*, A. Braun. The short and little-developed side branches impart a peculiar simple habit to this form. Leaves broadly linear, towards the point more narrowed, slightly wavy, on each side of the margin with about 24 teeth, and dotted by means of isolated brown cells.—Lake of Valencia with *N. latifolia* (Gollmer!).

5. *N. arguta*, Humb. Bonpl. et Kth. Leaves rather broadly linear, on each side of the margin with about 20 teeth, which are formed by a many-celled projection bearing a 1-celled spiny apex; sheaths as in *N. flexilis*.—New Granada (Humboldt!). For the present I regard as varieties:—

β. *tenera*, A. Braun.—N. tenera, *Schrad.* Caulinia tenera, *Nees ab Esenb.* Leaves rather thinner and narrower, with about 25 teeth on each side of the margin.—Brazil (Pœppig! Martius!).

γ. *conferta*, A. Braun. Densely branched, leaves curved outwards, narrow-linear, with about 10 teeth on each side of the margin.—Brazil (Max von Neuwied!).

6. *N. minor*, All.—Caulinia fragilis, *Willd.* Leaves bent backwards, narrow-linear, on each side of the margin with 7–10 large teeth, like those of *N. arguta*; edge of sheath strongly and slightly upward projecting, rounded-truncate, towards the upper part with 6–10 teeth; fruit slender, dotted.—Europe; Bengal (Hooker and Thomson!); Carnatic (Belanger!); Pondicherry (Perottet!); Egypt (Ehrenberg!); in North America, doubtful. I class as varieties several forms which I cannot distinguish as species by any decisive characters:—

β. *tenuissima*, A. Braun. Leaves horizontally patent, very narrow, setaceous, on each side of the margin with 6–8 minute teeth, com-

posed of a few cells projecting above the margin of the blade.—Finland (Hisinger !)

γ. *Indica*, A. Braun.—Caulinia Indica, *Willd.* (1798). Leaves not bent backwards, but straight, longer, towards the point more narrowed, the edge of the sheaths more elongated towards the top (ear-shaped) ; fruit conspicuously excavate-punctate.—I include under this heading several forms again distinguished by the length of the leaves and the number of the teeth ; 5–10, rarely 15 teeth are seen on the margins of the leaves of specimens from Tranquebar (Klein !), Sumbawa (Zollinger !), Mauritius (Bory ! in Herb. Willd., under the name of *N. australis*, Bory, and *N. alternifolia*, Willd.) ; 12–20 teeth, in the more robust forms from Manila (Meyen !) and Timor (Martens !).

δ. *setacea*, A. Braun. Leaves very narrow, setaceous (as in var. β), but with 20–30 very minute teeth, which, except the spiny point, are hardly projecting beyond the margin of the blade ; edge of the sheaths still more ear-shaped and elongated than in var. β, with 4 or 5 teeth on the upper part.—Mauritius (received from Mougeot without the collector's name).

7. *N. falciculata*, A. Braun. Leaves narrow-linear, narrowed towards the apex, with 10–20 teeth on each side of the margin, which are formed by several cells, but do not project as much as those of *N. minor* beyond the margin of the blade ; the edges of the sheaths are elongated upwards into auricles, which are rather long, pointed, curved, slightly sickle-shaped inwards, margin of the inner edge quite entire, and on the outside with 3–5 teeth (see Fig. 4 of first sketch). —Madras (Wight !) ; Manila (Martens !).

8. *N. graminea*, Del. (1813). Leaves linear, upwards slightly narrowed, with 36–40 teeth in the African specimens, 40–56 in the East Indian ; the teeth projecting with only 1 or 2 cells besides that of the spiny point, beyond the edge of the blade ; the sheaths on each side elongated into a lanceolate, pointed, stipulæform auricle, which both on the inside and outside is beset with numerous teeth (see Fig. 5 of first sketch).—Egypt (Delile !, Ehrenberg !) ; Cordofan (Steudner !) ; Bengal (Hooker and Thomson !) ; Ceylon (Martens !) ; Java (Junghuhn !) ; Celebes (Forsten !).

β. *tenuifolia*, A. Braun.—N. tenuifolia, *R. Brown*, *Prodr.* (1810). Leaves narrower, almost setaceous, on each side with 30–40 teeth, which hardly project beyond the edge of the blade, except with their

spiny point.—New Holland (Ferd. Mueller!).—This is the only form known to me from New Holland, and although it differs very much in outward look, I can neither separate it by any distinctive characters from *N. graminea* or from the Piedmontese plant described under the name of *N. Alaganensis*, Pollini (1824, under *Caulinia*), or *N. intermedia*, Nocca and Balbis (1821), and recently illustrated by M. Cesati.

GENTIANA GERMANICA, Willd.

In the interesting letter from Dr. Grisebach which we had the pleasure of publishing in March last, he says that the æstivation is not to be trusted as a specific character for *G. Germanica*, as he has seen cases of both kinds being found on the same individual plant. Nevertheless he appears to think that the quincuncial æstivation is the more common on that plant. I have now before me a considerable number of fine fresh specimens of *G. Germanica*, kindly sent by the Rev. H. H. Crewe, from Buckland, in Buckinghamshire. I find that most of the flowers on these specimens have contorted æstivation, but that one flower here and there presents the quincuncial structure, described by Grisebach in the 'Iter Hungaricum,' as quoted in our page 65; but I do not find that there is any regularity in the arrangement of the flowers, although it is perhaps more usually the terminal flower of the stem or a branch that has the quincuncial structure; yet I have seen the terminal flower contorted and a lateral flower close to it quincuncial. I fully agree with Dr. Grisebach in believing that the æstivation is here of no value even as a specific character. The "tubo sensim ampliato" of *G. Germanica* is well seen on these specimens when the flowers are expanded. It is truly a funnel-shaped tube, and thus differs considerably from the usual nearly cylindrical tube of *G. Amarella*.—C. C. Babington.

HYPERICUM UNDULATUM FOUND IN CORNWALL.

Mr. James Cunnach, of Helston, Cornwall, has found this plant abundantly in bogs near that town. He has known it, but not by

name, for several years. A botanical correspondent told him that it was *H. perforatum*, and he therefore has lost the chance of being the first recorder of it as a native of Britain.—C. C. Babington.

CORRESPONDENCE.

Gladiolus Illyricus (*Koch*).

Aug. 10, 1864.

Whilst staying at Brockenhurst, in the New Forest, at the end of June last, we were able to examine three of the localities given by Mr Wise for *Gladiolus Illyricus*, Koch.

We found it occurring sparingly over a considerable extent of ground at both Rhinefield and Oakley plantations, two almost exactly similar localities; in the third station, however, the neighbourhood of the Knightwood Oak, which widely differs from the two former, and where the *Pteris* is tall and luxuriant, we spent some time searching for it without success, by looking under the fern in the manner recommended by Mr. Syme. In this locality Mr. Keeley was equally unsuccessful last year, later in the season.

The *Gladiolus* affects chiefly the broad green open tracts or roads which intersect the two large plantations above mentioned. The plantations are composed of Firs, still of inconsiderable height, and have taken the place of woods cut down and cleared at perhaps no very remote period.

The plant is by no means constantly accompanied by *Pteris*, which in these roads forms patches of low stunted plants seldom more than 18 inches high; when growing amongst it, the *Gladiolus*, which varies in height ordinarily from 18 to 36 inches, is easily seen. The first specimens we met with sprang from the side of an old turf-grown cart-rut. We noticed only one small patch among the Firs themselves at Rhinefield, though in one corner of Oakley plantation there were some scores of fine plants so situated; a very few grew among the heather. Even in so dry a season as the present, many of the specimens were more than a yard high, and with as many as ten flowers.

To judge from the localities in which we found it, the *Gladiolus* prefers dry, open, unsheltered spots on a sandy soil, to sylvan situations, and this agrees with the habitats given by Continental botanists, viz. meadows, fields, or (*G. communis*, Linn.) even cultivated land. Possibly, till large tracts of the forest had been recently cleared, the *Gladiolus* was much less abundant, and so escaped notice.

Curtis mentions (Bot. Mag. 86) that *G. communis* increases rapidly by "offsets;" this is probably the case with the New Forest plant, as a large number of small bulbs are concealed under the meshes of the fibrous covering of the corm, at its base.

The character quoted by Professor Babington from Hooker's Flora, viz.

that "the edges of the upper petal are not covered by the two adjoining ones," does not apply to the fresh flowers when exactly in their prime, but only when they are beginning to go off,—a state marked by their change of colour from bright red to purple. Of course, the natural divergence of the petals is increased by the pressure employed in preparing specimens for the herbarium.

The figure in the 'Journal of Botany' (t. 4), though in most respects admirable, represents the petals as too patulous, and the colour of the flowers deeper and much less brilliant than is natural. The marking also in the centre of each of the three perianth-segments, forming the lower lip, though defined by a dark line, is not of so deep a tint as represented, but is pale with the colour round shading somewhat into it.—W. J. Dyer; H. Trimen.

NEW PUBLICATIONS.

A Flora of Ulster, and Botanist's Guide to the North of Ireland. By G. Dickie, A.M., M.D. 12mo, pp. 176. London: Lovell Reeve.

Dr. Dickie went to fill a professor's chair at Belfast with already considerable experience in the study of plant-topography. So little was known about the distribution of Irish plants, that he found a wide field of useful labour ready to enter upon. He has not failed to make use of his opportunity, but has worked in this field both diligently and intelligently; and though he modestly tells us we must take the present volume only as collectanea towards a more complete Flora, it seems likely that the list of plants is not far from completeness; and we are sure that the work will be welcomed heartily, both by the botanists of the district upon which it treats and by a wider circle.

The second title gives perhaps the most accurate idea of what the book really is. The bounds of the district embraced fall a little short in one direction of those of the province of Ulster, and they include in addition a slice of the northern portion of Connaught. The work gives a complete list of the species known to inhabit this tract, with much interesting information about their localities and vertical range, and a careful list of the stations observed by the author himself, and by other botanists, for any that are at all rare. The area of the North of Ireland, as thus limited, is in round numbers 10,000 square miles, which is rather less than twice that of Yorkshire, rather more than one-sixth of that of the whole of England and Wales. The latitude of the

northern point is about the same as that of Berwick-on-Tweed and the southern extremity of the Isle of Arran; and the fifty-fourth parallel of latitude, which Dr. Dickie takes for his southern boundary, passes not far from York and Lancaster. It includes considerable areas both of basaltic and granitic rock, and the sedimentary formations are represented from the Silurian up to the Chalk and Greensand. In county Down one of the peaks exceeds 900 yards, which is higher than any of the English hills, except those of the Lake district; and both in Donegal and Mayo there are peaks which exceed 800 yards. The mean annual temperature of Belfast is almost precisely the same as that of Greenwich, but the difference between the summer and winter months is appreciably smaller in the north of Ireland, and the difference between the actual extremes of temperature is notably less. What with proximity to the Atlantic, the indented character of the coast, and the occurrence of two large inland lakes, the aerial humidity is doubtless much greater than a comparison of 33 with 25—the respective rainfalls in inches of Belfast and Greenwich—gives an idea of. And finally there are stations for plants ranging from the rich green meadows and fertile corn-lands and flax-fields of the east, down the scale to where, in Donegal, over miles of dreary moor, *Schœnus nigricans* has, in the struggle for existence, conquered so thoroughly its competitors that they have all declined the unequal contest, and only a few scattered tufts of *Erica cinerea* and *Calluna* still linger on sufferance.

Checking off Dr. Dickie's list of species, according to their types of distribution, as given in the fourth volume of the 'Cybele,' we obtain the following result :—

Out of 532 species referred by Mr. Watson to the British type of distribution, the North of Ireland, according to Dr. Dickie, has				503.
Out of 409 species of the		English type, North Ireland has		178.
127	„	Germanic type,	„	6.
70	„	Atlantic type,	„	23.
81	„	Scottish type,	„	49.
120	„	Highland type,	„	34.
37	„	Intermediate type,	„	7.
49	„	Local type,	„	6.

This gives us a total of 806 for North Ireland out of 1425 for Britain, and there are 3 others, *Arenaria ciliata*, *Carex canescens*, and *Saxi-*

fraga umbrosa, which are North Irish but not British, unless we regard the Saxifrage as a native of Yorkshire.

The 29 species of the British type which are deficient are mostly plants which might easily be passed over as something else, and it is most likely, therefore, that a large proportion of them will be found ultimately. Such are *Cardamine sylvatica*, *Callitriche platycarpa*, *Veronica polita*, *Ulmus montana*, *Potamogeton oblongus*, *Agrostis alba*, *Avena fatua*, and *Glyceria plicata*. The absence from the north of Ireland of 55 per cent. of the plants of the English type is a very notable characteristic; in fact this is the circumstance to which, in comparing the two lists, it is most needful our attention should be directed. Amongst the absentees are many plants which are both widely distributed and plentiful where they occur on this side of St. George's Channel. Such are *Ranunculus arvensis*, *Ononis spinosa*, *Vicia tetrasperma*, *Reseda lutea*, *Viola hirta*, *Senecio erucifolius*, *Galeopsis Ladanum*, *Anthemis arvensis*, and *Orchis Morio*. The Cowslip and *Chærophyllum* are both very local. There is but 1 *Linaria*, 1 *Medicago*, 2 species of *Allium*, 2 of *Orobanche*, 3 *Campanulaceæ* out of 14 British species, in Dr. Dickie's list. Out of the 6 Germanic species, 3 are doubtfully indigenous. The other 3 are *Monotropa*, *Orchis pyramidalis*, and *Salicornia radicans*. The 34 Highland species seem mostly quite rare in this tract, and all except 7 of them are plants which reach Yorkshire. The total North Irish flora is rather smaller than that of Surrey, which is about one-fourteenth of its area, and has only 2 or 3 out of its 90 boreal species. North Yorkshire, one-fifth its area and under the same latitude, has of the three Australian types nearly 7 species for every 4 which Dr. Dickie enumerates.

Even in the county of Antrim cultivation ceases at about 1000 feet above the sea-level. The highest peaks may safely be considered as attaining Mr. Watson's Mid-Arctic zone. *Salix herbacea*, a good test-species for the lower boundary of this zone, grows upon several of the peaks, and descends to 1700 feet in Donegal. *Erica Tetralix* and *cinerea*, which usually stop upwards in Scotland about where the *Salix* begins, attain, in the north of Ireland, 1600 and 1900 feet respectively. Dr. Dickie has made notes of the altitude attained by plants upon several of the higher peaks, but for further details we must now refer our readers to the book itself.

The Third Annual Report of the Acclimatization Society of New South Wales. 8vo, 110 pp. Sydney, 1864.

The leaders of Natural Science in New South Wales have, in our opinion, acted wisely in giving a practical tendency to the study of Natural History in all its branches, by establishing an Acclimatization Society, and thus aiming at results which can be appreciated by every intelligent colonist. To stock the rivers with fish, the woods with birds, the pastures with new kinds of four-footed animals, the orchards with fruit-trees, and the gardens with vegetables and esculents never before seen in these parts, is an object in which every one who has the well-being of the country at heart can cordially co-operate, and we are not surprised to see in the Third Annual Report of the Society so long a list of members. Few countries were so badly provided by nature with useful plants and animals as Australia; literally speaking, we do not receive from it a single indigenous product, either animal or vegetable, for our table. Australia could add nothing to the comforts of civilized man in this respect; but how much she has already received from the other quarters of the globe, we learn from the excellent address which Dr. George Bennett, that veteran traveller and explorer, delivered at the last anniversary meeting:—

"We have lately heard of acclimatization dinners in London and other places, but a dinner in New South Wales of food naturalized in the colony, occurs every day, and a finer display cannot be surpassed in any country, for we are able to place on the table beef, mutton, pork, veal, rabbits, venison, hams, tongues, etc. etc.; our poultry market abounds in turkeys, geese, guinea-fowls, pigeons, a great variety of fowls and ducks, and the Acclimatization Society could supply peacocks, pheasants, and Buenos-Ayrean ducks. Then we have our large supplies of wheat, barley, oats, and maize, and by our system of naturalization are able to place bread, cheese, butter, eggs, and salads on the table. Of esculent vegetables we have a large supply, and if our dessert had been confined to native produce, it would have consisted of jibbongs, five-corners, cloudberries, lillipillies, the scarlet quandong, native currants, and the handsome but rather tasteless fruit of the *Cargillia* and *Achras*, known by the name of 'native plum,' and many others about equal in quality, that is, almost tasteless. Instead of these, by naturalization we can now exhibit peaches, nectarines, pineapples, a large variety of choice apples and pears, plums, and also display oranges, lemons, citrons, shaddocks, grapes (in great variety), strawberries, bananas, cherries, and a number of others,—the cherimoya and mango may also be included; and for exotic flowers they are in great profusion: roses of every tint, and lilies of every hue, indeed flowering trees and plants have been collected from all parts of the world, and in a few years become

naturalized, lavishing their gay and brilliant blossoms for the adornment of our gardens, gratifying by their display of bright colours, as well as by the diffusion of their fragrance. Well may Australia be distinguished as a land of fragrant flowers and delicious fruits, for by acclimatization they are produced in great abundance."

The Society will have not only to add to this long list, but also take care that what is already introduced shall not be lost. That there are members fully alive to the importance of this part of the Society's duty we learn with pleasure. At the last anniversary meeting Mr. Moore, the zealous Director of the Botanic and Zoological Gardens at Sydney, took upon himself the part of the warning Cassandra :—

"Mr. C. Moore said it might not be thought presumptuous in him to say a few words bearing on a point that had been referred to by Dr. Bennett; it was that of the disease that had visited the wheat crop in this colony. It struck him—though he confessed he had no proof of the fact—that the wheat had become deteriorated and impoverished in character, and that thus it had been made susceptible of the growth of the peculiar fungus that had attacked it. He thought that the fungus was not the cause but the effect of that deterioration. As he would throw it out for the consideration of those who might be interested in the matter that it would be most advisable in future, instead of sowing seed that had been produced in the neighbourhood, and which might be similarly deteriorated, to sow with seed obtained from a colder country. It was well known to every one engaged in the cultivation of plants, that plants or even fruit-trees brought to a warm country from a cold country were of a much hardier character than those brought from a warm to a cold country. It would be well, therefore, for the farmers to obtain fresh seed from Tasmania or New Zealand, or much better still, from Europe. It would also be well for them to introduce the Polish and the mummy wheat. They must now look to something better than wheat, for their crops were almost ruined. There were many plants that might be cultivated with success, and he thought profitably in this country, but which were seldom or never thought of. There was, for instance, the Olive, which he was satisfied would succeed admirably on the northern shore. He mentioned this subject more particularly now, as he was aware that Mr. Baptist had introduced from the continent of Europe, and was now growing, some of the best kinds of Olive. Reference had been made to silk, but it was almost useless for him to observe that the plant required for the silkworm was most easily grown in the colony. He regretted that more advantage had not been taken of the quantity of seed that had been obtained from the South of Europe."

The Society has recently done a wise thing in agreeing to admit ladies to the right of membership. We believe the Botanical Society of Canada was the first which showed the way in this direction, and we have seldom read a more practical report than the first furnished by

its ladies' committee. It is frequently found that new vegetables, though recommended by men of eminence, do not become general favourites, on account of the opposition offered by the kitchen. That useful institution soon discovers the defect or disadvantage under which any new introduction labours; and it was reckoning without the host to recommend a new vegetable for general adoption, without first ascertaining in the places most competent to give an opinion, whether it was admissible or not to the domestic hearth.

"The object of this Society," continues Dr. Bennett, "is still further to introduce in our extensive territory, useful animals and plants, and also to improve those already naturalized in the colony. I recollect that in 1849 a prize was awarded to the late Mr. Thomas Woolley, for a 'New Rare Plant.' This was that excellent medicinal plant the Dandelion (*Leontodon Taraxacum*), having been for the first time introduced alive into this colony, and consequently very rare. About two years ago I saw a plant growing wild in the bush on the north shore, both in flower and seed, and it is now growing wild and in great luxuriance about Braidwood, and there is a specimen from that district now before you given me by Mr. Gratton, the climate in that part of the colony being very congenial for its growth, as well as also for our English Daisy and Buttercup. This plant is extensively employed in medicine, a large quantity of the preparations from it is imported into the colony, and therefore its introduction will be very beneficial."

We trust that a society so useful will continue to prosper, and shall be glad to hear that the Government of New South Wales so far appreciates its services as to aid it by liberal grants, and thus enable it to carry out more fully the object and aims for which it was established.

Cæoma pinitorquum; ein neuer, der Kiefer verderblicher Pilz.
Von A. de Bary. Berlin, 1864, 8vo.

This tract of sixteen pages is a reprint from the Proceedings of the Berlin Academy for December, 1863. It treats of a species of Uredinous Fungus, which attacks the young shoots of Pines (*Pinus sylvestris*). This parasite appears to have been first noticed in 1860, and since more plentifully in the north of Europe. The paper is partly occupied in minute description of the *Uredo* in its different ages and stages, and partly in a recapitulation of the conclusions to which Dr. de Bary has arrived in consequence of his numerous investigations, recently published at large in the French 'Annales.' The gist of these conclusions is that the same Fungus may appear under the form of a

Uredo, *Puccinia*, and *Æcidium*; that many of them he believes to have traced through these modifications, and that *Cæoma pinitorquum* is no exception. A coloured plate accompanies this reprint, with figures of the stylospores and spores, with horizontal and transverse sections of a pustule, in which they are generated. To mycologists it is sufficient to indicate the name of the author of this paper to ensure its perusal. The elaborate minute examinations, and extensive experimental culture of parasitic Fungi, conducted by this gentleman during the past two or three years, give weight to all he writes on the subject, whilst the details he has published in combination with the preparatory investigations, have procured for him a lasting place in the foremost rank of living mycologists.

BOTANICAL NEWS.

At the anniversary meeting of the Royal Botanic Society, Regent's Park, Professor Bentley in the chair, Mr. Sowerby, the secretary, read the report, which stated that the present number of Fellows was 2,334, of whom 137 had been elected during the past year. The receipts from all sources had been satisfactory. As many as 20,972 tickets had been sold for the exhibitions. Although the expenditure had been increased materially by the repairs which had been executed, the receipts were still in excess. The income had been £10,781, and the expenditure £8,059. 7*s*. The number of students was 163; the lectures had been well attended.

Professor Asa Gray, on mentioning some of the contents of our periodical, says, "in the same useful Journal for November, 1863, is a translation of a paper by Dr. Milde on the Geographical Distribution of *Equisetaceæ*," etc. We beg to state in explanation, that Dr. Milde's paper was not a translation in the ordinary sense, but an original article sent to us direct by the author, and rendered by us into English.

Mr. Ernst has lately made two ascents of the Silla de Caracas, Venezuela, and has been rewarded by a rich collection of plants. He intends making a third ascent.

"Society of Amateur Botanists" is the unassuming name of an association formed in 1862, and now sufficiently consolidated to merit a brief notice. It was at first only designed as a bond of union between the students in different elementary classes established in the metropolis. These having performed their work, it was thought that some stimulus was necessary to cause the work commenced to be carried towards practical application. The Society, though thus established for a fixed purpose, is open to other

amateur botanists than those for whose especial benefit it was formed. The prospectus at first circulated, and still adhered to, defines the objects aimed at to be mutual assistance in the study of British plants by organized excursions, by the establishment of a herbarium, museum, and library, the interchange of specimens, the communication of papers, and such other means as from time to time might present themselves. These objects are carried out by excursions during the summer on alternate Saturday afternoons, and by meetings on the first and third Wednesday evening in every month at eight o'clock, at 192, Piccadilly, when papers are read, often of an interesting character. The substance of two of these on *Euphorbia amygdaloides*, and on Dioicous flowers, by Mr. W. G. Smith, was recently published in this Journal. A herbarium (phanerogamic and cryptogamic) has been commenced, the nucleus of a library of practical works (chiefly local floras) been collected, and the museum—if so grand a name can be applied to the collection of fruits and seeds of British plants—is in embryo. In the interchange of specimens but little has as yet been done, although scarce a meeting passes without a few desiderata being supplied to members. The conditions of membership exclude no one, of either sex, taking interest in botanical pursuits. An admission fee of half-a-crown, and an annual subscription to the same amount, have yielded sufficient funds for the working of the Society. Residents in the country are admitted as corresponding members on payment of the admission fee. In its quiet and unassuming manner, this association continues to increase in numbers and usefulness. At present it contains about fifty members, and its meetings and excursions are well attended. Such a Society only needs to be better known to ensure increase. It is in contemplation to commence a register of all plants, whether cryptogamic or phanerogamic, found by the members within a reasonable distance of London. Efforts will be made, not only to record the occurrence of cryptogamic plants, but also to obtain as good a collection of them in the herbarium as circumstances will permit. In furtherance of this object, the president (Mr. M. C. Cooke) will be enabled to render valuable assistance. The Society has been well advised in combining a field-club with a chamber-association, practice with theory, and instead of becoming merely a company for the collection of rare plants, is devoting itself to a close examination of common ones, as testified by such papers as those alluded to, and others of a similar character.

M. T. Caruel has published a 'Florula di Montecristo' (Milan, 1864), an island made famous by a much-read French novel, and now the property of an English gentleman, Mr. G. Watson Taylor, who supplied the principal materials for this florula, containing 344 Phanerogamic plants and ferns.

A correspondent of one of the daily papers, in describing the living in the Confederate army at Port Pemberton, says: "The tea used was made of leaves gathered on the island from a plant known among its aboriginal inhabitants as the *Youpon*, a shrub that, if not identical with, is at least possessed of many points of resemblance to that favourite of the South Americans, Paraguayan Maté." What is the *Youpon?* *Ilex vomitoria* or *Ceanothus Americanus?*

Vincent Brooks, Imp.

APHELANDRA ORNATA, T. Anders., A RECENTLY INTRODUCED ACANTHACEOUS PLANT FROM BRAZIL.

By T. Anderson, M.D.

(Plate XXII.)

This beautiful foliage plant was introduced into Belgian gardens in 1858, from Bahia, Brazil, by M. Porte, and the accompanying drawing was made from specimens which flowered with Mr. Linden, at Brussels, early this year. The beautifully variegated leaves, the purple petioles and scapes, the bright yellow flowers, and the large bracts with their purplish tinge, render this plant a desirable acquisition in our gardens. It is the *Aphelandra (Aphelandrea) ornata*, T. Anders. mss. (*Lagochilium ornatum*, Nees ab Esenb. in De Cand. Prodr. xi. p. 291). I unite *Aphelandra* and *Lagochilium*, and find that I have two undescribed species of *Aphelandra* in my herbarium, viz.—

Aphelandra chartacea, mihi; bracteis magnis, coloratis, chartaceis.—Hab. in Peruvia orientali, prope Tarapoto (Spruce! n. 3957). And—

Aphelandra nervosa, mihi; bracteis glabris, junioribus margine ciliatis, reticulatis.—Hab. in Peruvia orientali, prope Tarapoto (Spruce! n. 4440).

Botanic Gardens, Calcutta, August 23, 1864.

Explanation of Plate XXII., representing *Aphelandra ornata*, T. Anders.—Fig. 1. Bracts and calyx; 2, corolla laid open; 3, anthers; 4, ovary and style; 5, stigma:—*all more or less magnified.*

REVISION OF THE NATURAL ORDER *HEDERACEÆ*.

By Berthold Seemann, Ph.D., F.L.S.

(*Continued from p.* 250.)

II. On the Genera with a Single Style.

There are only a few genera having a single style, genera in which the ovary is elongated into a short conical stylopod being more common; these are *Brassaiopsis*, *Macropanax*, *Pentapanax*, *Agalma*, *Dendropanax*, and *Hedera*. I follow Lowe in his 'Flora of Madeira'

in calling the style *single* rather than *simple*, because in *Hederaceæ* that organ is always composed of two or more styles, in the genera here provisionally grouped together so closely united as to form a single column, and separating either not at all or just a little at the top; but they never become disunited to the very base, and bend back as in *Gastonia*, *Grotefendia*, *Polyscias*, *Gilibertia*, etc.

CONSPECTUS GENERUM HEDERACEARUM STYLO UNICO.

* *Ovarium* 2-*loculare*.

10. *Brassaiopsis*. Pedicelli inarticulati. Flores ecalyculati. Albumen æquabile.—Arbores aculeatæ Asiæ tropicæ et subtropicæ, foliis simplicibus, palmatis v. digitatim sectis.

11. *Macropanax*. Pedicelli articulati. Flores calyculati. Albumen ruminatum.—Frutices inermes Indiæ orientalis, foliis digitatim compositis.

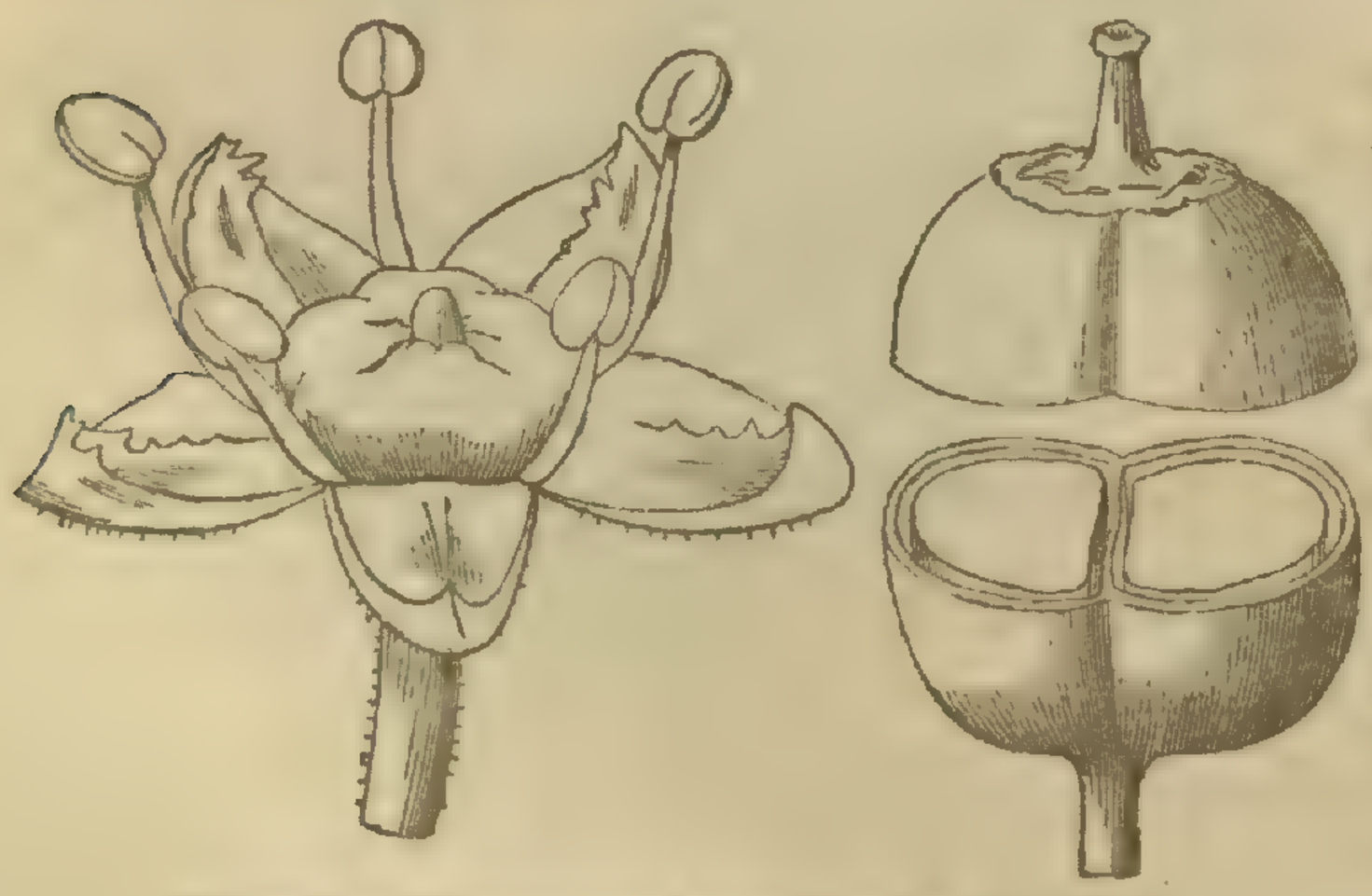
** *Ovarium* 5-(*per excessum* 6-)*loculare*.

12. *Pentapanax*. Pedicelli articulati. Flores calyculati. Drupa exsucca. Albumen æquabile.—Arbusculæ inermes Indiæ orientalis, foliis pinnatis.

13. *Agalma*. Pedicelli inarticulati. Flores ecalyculati. Drupa exsucca. Albumen æquabile.—Arbores inermes Asiæ tropicæ, foliis digitatim compositis.

14. *Dendropanax*. Pedicelli inarticulati. Flores ecalyculati. Drupa baccata. Albumen æquabile.—Arbores inermes Americæ et Asiæ tropicæ et subtropicæ, foliis simplicibus.

15. *Hedera*. Pedicelli inarticulati. Flores ecalyculati. Drupa baccata. Albumen ruminatum.—Frutices sarmentosi, inermes, in Europa Asia et Africa indigenæ, foliis simplicibus.



Brassaiopsis speciosa (*partly after Hooker*).

X. BRASSAIOPSIS, Dcne. et Planch. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calyx tubo obconico, limbo 5-dentato. Petala 5, ovato-triangularia, 1-nervia, apice incurvula, libera, æstivatione valvata.

Stamina 5, petalis alterna; filamenta filiformia; antheræ subrotundatæ. Ovarium 2-loculare, loculis 1-ovulatis. Ovula pendula. Stylus unicus, compressus; stigma obscure 2-lobatum. Drupa subglobosa, 2-locularis. Semina solitaria. Albumen æquabile.—Arbores aculeatæ in Asia tropica et subtropica vegetantes, stipulis nullis, foliis alternis longe petiolatis palmato-5-lobis, lobis argute dentatis v. digitatim 5–8-sectis, segmentis dentatis, umbellis globosis longe pedunculatis in racemos v. paniculas dispositis involucratis, pedunculis pedicellisque compressis, floribus albidis. — *Brassaiopsis*, Dene. et Planch. Rev. Hort. 1854, p. 106; Planch. Hort. Donat. p. 8; *Hederæ*, *Panacis*, *Kalopanacis* et *Araliæ* sp. auct.

C. Koch ('Wochenschrift,' 1859, p. 364) has endeavoured to show that *Brassaiopsis* and *Macropanax* are identical, but he had evidently overlooked that *Brassaiopsis* (of which *Hedera glomerulata*, Bot. Mag. t. 4804, is the type) has inarticulate pedicels, no calyculus, and a very distinct habit. It is true that Miquel referred *Hedera glomerulata* to his genus *Macropanax;* nevertheless it does not agree with the generic character he furnishes, and is very different from *M. oreophilum*. Decaisne and Planchon, in their valuable paper on *Hederaceæ*, ascribe to their new genus *Brassaiopsis* two short styles, but there is only one, as in the absence of specimens may be seen from Hooker's very correct figure; and by a slip of the pen the island of Bourbon, instead of Java, is named as the native country of *B. speciosa*.

1. *B. Hainla*, Seem. mss.—*Hedera Hainla*, Hamilton, mss. in Don, Prod. Fl. Nep. p. 187 (1825); De Cand. Prodr. iv. p. 253. *H. polyacantha*, Wall. Cat. n. 4907; Wall. Plant. Asiat. t. 190; Don, Gen. Syst. iii. 392; Walp. Rep. ii. p. 431 and 432. *H. scandens*, De Cand. Prodr. iv. p. 264? *Panax palmatum*, Roxb. Fl. Ind. ii. p. 74 (1832). *P. curcifolia*, Griff. Itinerary Notes, p. 145. *Aralia palmata*, Lour. Fl. Cochinch. p. 233? non Lam. *A. scandens*, Poir. Suppl. i. p. 419?

Nepal (Hamilton! in Mus. Brit.; Wallich! n. 4907); moist valleys of Chittagong (Roxburgh); Bootan (Griffith! n. 2667), towards Oongar Bridge, in forests, 5–6000 feet (Griffith! n. 697), Sikkim (Hook. fil. et Thoms.!).

2. *B. ricinifolia*, Seem. mss.—*Panax ricinifolium*, Sieb. et Zucc. in Abhandl. Bair. Akad. iv. 2, p. 198.—*Kalopanax ricinifolium*, Miq.

Ann. Mus. Bot. Lugd. Bat. vol. i. p. 16. Japan (Siebold ! in Herb. Benth.), N. China (Fortune! in Herb. Mus. Brit.).

3. *B. hispida*, Seem. sp. n.; ramis petiolis pedunculisque hispido-aculeatis, aculeis rectis, foliis palmato-10-lobis, lobis ovatis v. oblongis acuminatis setoso-serratis, supra glabris, subtus ad nervos ferrugineo-hirtellis hinc inde aculeatis, umbellis multifloris (50–60) in paniculas terminales dispositis, pedicellis rufo-hirtellis, calycibus tomentosis, petalis glabris.—Bootan (Griffith! n. 2066 in Mus. Brit.).

Judging from the dried specimen, the peduncles are stiff and patent, not drooping as in *B. speciosa*. Leaves nearly a foot across; peduncles 5 inches long; bracts surrounding the base of the pedicels lanceolate-linear acute; the whole inflorescence forming terminal panicles 1–1½ feet high.

4. *B. confluens*, Seem.; ramis petiolisque aculeatis, foliis glabris palmatim 8–9-lobis, lobis pinnatifidis v. bipinnatifidis, umbellis globosis longe pedunculatis solitariis v. racemosim dispositis, junioribus stellato-pubescentibus, calyce 5-dentato, stylo 1, fructu subgloboso latiore leviter compresso, 2-spermo.—*Hedera confluens*, Wall. Cat. n. 4910, ex parte; Nepal (Wallich ! n. 4910, ex parte).

The sheet of Wallich's Herbarium at the Linnean Society containing this plant, has two other *Hederaceæ* pasted on it, all three of which are labelled n. 4910. One of them is probably another species of *Brassaiopsis*, with unarmed petioles and palmate 3–5-lobed leaves; the other is a *Trevesia*.

The leaves of *B. confluens* are 1½ foot across. The petiole is at the top expanded into the blade, from which spring 8–9 mostly bipinnatifid lobes. It is a magnificent species.

5. *B. speciosa*, Dcne. et Planch. l. c.—*Macropanax glomerulatum*, Miquel in Bonplandia, 1856, p. 139. *Aralia glomerulata*, Blum. Bijdr. p. 873. *Hedera glomerulata*, De Cand. Prodr. iv. p. 265; Hook. Bot. Mag. (1854) t. 4804. *Brassaiopsis floribunda*, Dcne. et Planch. Hort. Donat. p. 8, excl. syn. Wall. *Gastonia longifolia*, hortorum.—Java (not Bourbon, as stated by Dcne. and Planch.). Decaisne and Planchon have introduced considerable confusion into the synonymy of this species by abandoning (Hort. Donat.) the name *speciosa*, which a few months previously they gave to the plant, and quoting Wallich's *H. floribunda* as a synonym. I have retained the oldest name.

6. *B. floribunda*, Seem. mss. in Herb. Mus. Brit.—*Hedera floribunda*,

Wall. Cat. n. 4912 A; G. Don, Gen. Syst. iii. p. 394. *Hedera Wallichiana*, Steudl. Nom. Bot.—Nepal (Wallich! n. 4912A); Khasia Mountains, 2000–4000 feet high (Hooker fil. et Thomson!)

Segments of leaves ovate at base; minutely dentate, or almost quite entire at the edge. Peduncles unarmed.

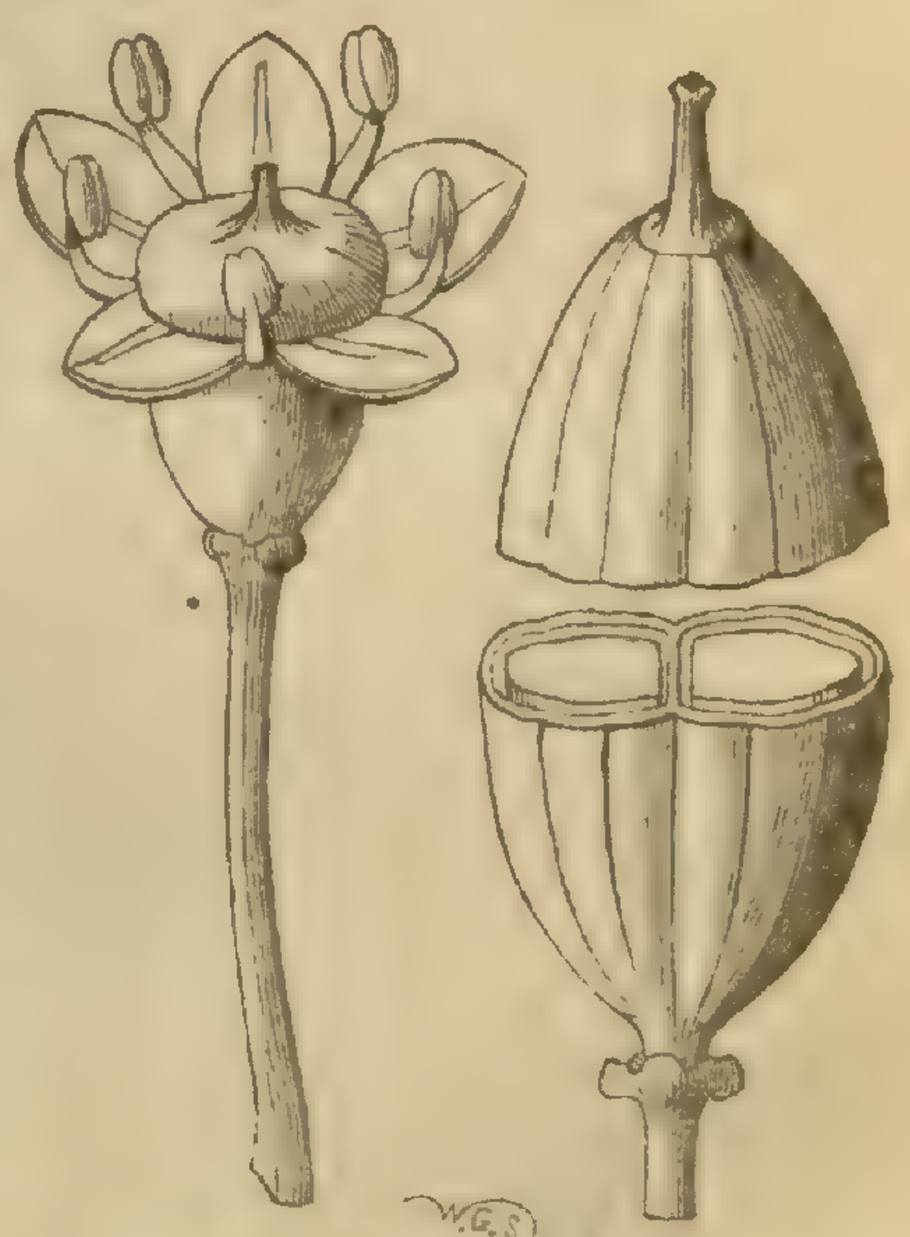
7. *B. aculeata*, Seem. mss. in Herb. Mus. Brit.—*Hedera aculeata*, Ham. in D. Don, Fl. Nepal. p. 185; De Cand. Prodr. iv. p. 264. —Nepal (Hamilton! in Mus. Brit.).

Segments of the leaves acute at base, and coarsely serrated at the edge; umbels on stiff peduncles 2–3 inches long.

Obs.—The leaves of the last three species seem, at first sight, compound, but on closer inspection it will be found that there is no articulation at the base of the apparent leaflets, but that the top of the petiole is expanded, then suddenly contracted, and again expanded into leaflet-like segments. In *B. confluens* the same structure is repeated on a much larger scale. I took some pains to investigate this structure, as *Brassaiopsis* seemed to be the only genus of the Order in which simple and compound leaves occurred together.

8. *B. cyrtostyla*, Seem.—*Macropanax cyrtostylum*, Miq. Ann. Mus. Lugd. Bat. i. p. 13.—Sumatra (Korthals).

XI. MACROPANAX, Miquel. Pedicelli articulati. Flores calyculati, polygami. Calyx tubo obconico, limbo 5-(vel per excessum 6-)dentato. Petala 5 v. 6, ovata, libera, æstivatione valvata. Stamina 5 v. 6, petalis alterna; filamenta filiformia; antheræ ovatæ. Ovarium 2-loculare, loculis 1-ovulatis. Ovula pendula. Stylus unicus, cylindricus, stigmatibus 2 orbiculari-convexis subunitis. Drupa ellipsoidea, subsicca, lævis, 2-locularis. Semina solitaria. Albumen ruminatum.—Frutices inermes Indiæ orientalis, foliis exstipulatis digitatim 5–7-foliolatis, foliolis serratis, umbellis in racemos v. paniculas dispositis. *Macropanax*, Miq. in Bonplandia, 1856, p. 139.



Macropanax undulatum.

1. *M. oreophilum*, Miquel in Bonpl. l. c. p. 139; Flor. Nederl. Ind.

vol. i. pars 1, p. 763.—*Panax serratum*, Wall.; De Cand. Prodr. iv. p. 253. *Aralia disperma*, Blum. Bijdr. p. 872. *Hedera disperma*, De Cand. Prodr. iv. 265. *Aralia (?) calyculata*, Zoll. et Moritz. Syst. Verz. p. 265. *Brassaiopsis disperma*, C. Koch, Wochenschrift, 1859, p. 364.—Java (Horsfield! in Mus. Brit.; De Vriese! Junghuhn! in Herb. Hook.) 3000 4000 feet above the sea; Sumatra and Laronan (fide Miquel), Bootan (Griffith! n. 206); Nepal (Wallich! Cat. n. 4915); Khasia Hills (Hook. fil. et Thomson!).

Var. β, *foliolis multo tenuioribus*. *M. floribundum*, Miq. l. c.—*Brassaiopsis floribunda*, C. Koch, Wochenschrift, 1859, p. 364.—Java (Junghuhn! in Herb. Hook.).

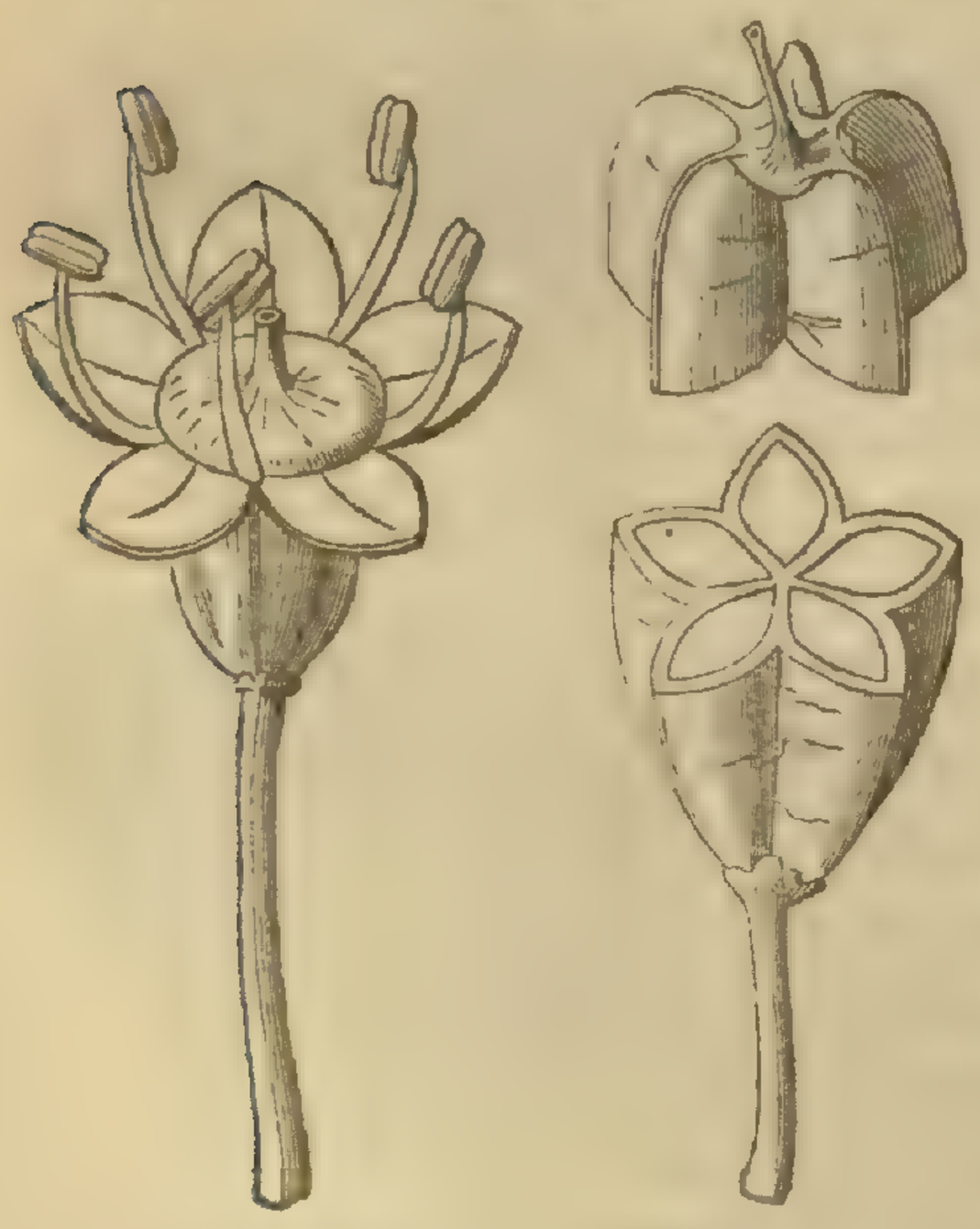
2. *M. undulatum*, Seem. mss. in Herb. Mus. Brit.—*Hedera undulata*, Wall. Cat. n. 9416 A); Don, General System, iii. p. 394; Walp. Rep. ii. p. 432 (v. s. sp.)—Silhet (Wallich! n. 9416 A); Khasia (Hooker fil. et Thomson); Sikhim (Hooker fil. et Thomson!).

3. *M. concinnum*, Miq. Ann. Mus. Lugd. Bat. i. p. 220.—Java (De Vriese).

Species exclusæ:

M. cyrtostylum, Miq. = *Brassaiopsis cyrtostyla*, Seem.

M. glomerulatum, Miq. = *Brassaiopsis speciosa*, Dcne. et Planch.



Pentapanax Leschenaultii.

XII. PENTAPANAX, Seem. gen. nov. Pedicelli articulati. Flores calyculati, hermaphroditi. Calyx tubo obconico angulato, limbo 5-dentato. Petala 5, ovata, 1-nervia, libera, æstivatione valvata. Stamina 5. Stylus 1, 5-angulatus; stigma 5-lobatum. Fructus oblongus, acute 5-angulatus, 5-locularis. — Frutices v. arbusculæ Indiæ orientalis, inermes, foliis alternis, pinnatim 3–5-foliolatis, foliolis coriaceis v. submembranaceis, ovatis v. oblongis, basi obtusis v. subcordatis, integerrimis, serratis v. setoso-serratis, racemis v. umbellis compositis, pedicellis sæpe elongatis subfiliformibus, apice incrassatis.—*Pentapanax*, Seem. mss. in Herb. Mus. Brit. *Panacis* et *Hederæ* sp. auctor.

Flores racemosi.
- Pedicelli hirtelli . . . . . *P. racemosum.*
- Pedicelli glabri . . . . . *P. subcordatum.*

Flores umbellati
- Pedicelli hirtelli . . . . . *P. umbellatum.*
- Pedicelli glabri.
  - Foliola coriacea, integerrima . . . . *P. parasiticum.*
  - Foliola membranacea, setoso-serrata . . *P. Leschenaultii.*

1. *P. racemosum*, Seem. mss. in Herb. Mus. Brit.; glabrum, foliis longe petiolatis pinnatim 3-5-foliolatis, foliolis petiolulatis obovatis v. ovato-oblongis, basi obtusis v. subcordatis, acuminatis, subintegerrimis, floribus distincte racemosis, racemis longis gracilibus paniculatis, pedunculis pedicellisque hirtellis, pedicellis basi bractea suffultis, calyculo fimbriato (v. s. sp.).

Sikhim (Hooker fil. et Thomson! in Herb. Mus. Brit.), 4000–6000 feet above the sea.

This plant was distributed by Drs. Hooker and Thomson under *Hedera subcordata*, Wall., but it is not identical with the species described by Don under that name from Wallich's authentic specimen. The panicles are $1\frac{1}{2}$ foot long, and at the base (as are the young leaf-branches) furnished with persistent scales (perulæ).

2. *P. subcordatum*, Seem. mss. in Herb. Mus. Brit.; glabrum, foliis pinnatim 5-foliolatis, foliolis longiuscule (1–$1\frac{1}{2}$ poll. long.) petiolulatis ovato-oblongis acuminatis, basi rotundatis vel subcordatis, serratis, serraturis obtusiusculis, floribus distincte racemosis, pedunculis pedicellisque glabris, calyculo integro.—*Hedera subcordata*, Wall. Cat. n. 4917; G. Don, Gen. Syst. iii. p. 394 (v. s. sp.).—Silhet (Wallich! n. 4917, in Herb. Soc. Linn. Lond.); Khasia Hills (Hooker fil. et Thomson!).

Blade of leaflets from 4–$5\frac{1}{2}$ inches long, 3–4 inches broad.

Both this and the preceding species differ in their truly racemose flowers from the other species of *Pentapanax*, but they agree so well in every other respect, that I cannot separate them generically.

3. *P. umbellatum*, Seem. mss. in Herb. Mus. Brit., foliis pinnatim 5-foliolatis, foliolis petiolulatis ovatis acuminatis, basi obtusis, serratis coriaceis, floribus umbellatis, umbellis compositis, pedunculis pedicellisque hirtellis, calyculo subintegro (v. s. sp.).—Khasia (Hook. fil. et Thomson!).

Differs from *P. Leschenaultii* (for which it was mistaken by Hooker

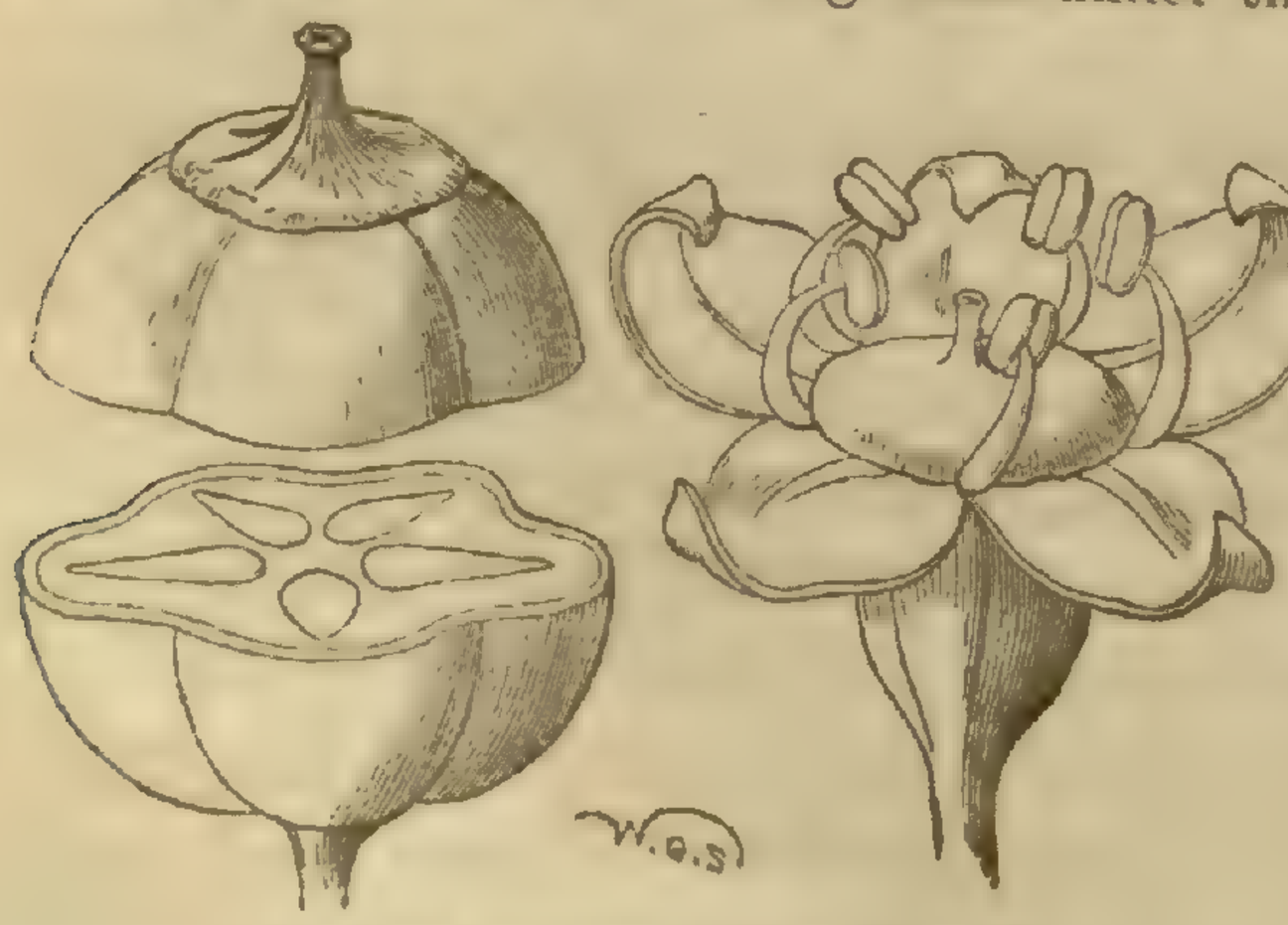
and Thomson) in its coriaceous, not setoso-serrate leaves, and hirtellous peduncles and pedicels, from *P. racemosum* in its umbellate flowers.

4. *P. parasiticum*, Seem. mss. in Herb. Mus. Brit.—*Hedera parasitica*, Don, Prodr. Fl. Nepal. p. 188; De Cand. Prodr. iv. p. 265. *Hedera glauca*, Wall. Cat. n. 4921; Don, Gen. Syst. iii. p. 394; Walp. Rep. ii. p. 432 (v. s. sp.).—Nepal (Hamilton! in Herb. Mus. Brit.; Wallich! n. 4921).

I have identified *Hedera parasitica*, Don, with *H. glauca*, Wall., by means of the authentic specimens, one existing in the British Museum, the other in Burlington House. *Hedera acuminata*, which Thwaites unites with *Hedera parasitica*, is at once distinguished generically by its five free styles. Leaflets quite entire, with the exception of the ultimate one, almost sessile; umbels globose terminal, simple or compound, springing from scaly buds.

5. *P. Leschenaultii*, Seem. mss. in Herb. Mus. Brit.—*Panax Leschenaultii*, De Cand. Prodr. iv. p. 254. *Hedera Leschenaultii*, Wight et Arn. Prodr. i. p. 377. *Panax bijugum*, Wall. Cat. n. 4937; Don, Gen. Syst. iii. p. 386. *Hedera trifoliata*, Wight et Arn. Prodr. i. p. 377; Wight, Icon. Plant. t. 307. *Hedera fragrans*, Don, Fl. Nepal, p. 187, non Roxb. (v. s. sp.).—Nepal (Wallich! n. 4937); Sikhim (Hooker fil. et Thomson!); Nilgherrie Hills (Leschenault); Kumaon (Strachey et Winterbottom!); Bootan (Griffith! n. 2065).

Wight and Arnott separate the trifoliate from the 5-foliate form, stating that they had never seen a plant where both kinds of leaves occur. There are no other differences between those two supposed species; and, as I have seen specimens with both 3- and 5-foliolate leaves, I have no hesitation in uniting them under the oldest specific name.



Agalma rugosum (*after Miquel*).

XIII. AGALMA, Miq.

Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calyx tubo obconico, limbo 5–6-dentato. Petala 5–6, ovato-triangularia, libera, 1-nervia, apice incurvula, æstivatione valvata. Stamina 5–6; antheræ oblongæ.

Stylus 1; stigma 5–6-lobatum. Ovarium 5–6-loculare, loculis 1-ovulatis. Drupa oblonga, exsucca, 5–6-angulata, 5–6-pyrena. Albumen æquabile.—Arbores inermes Asiæ tropicæ, foliis digitatim foliolatis, foliolis integerrimis v. dentatis, floribus racemosis v. umbellatis in paniculas dispositis, petalis viridiusculis.—*Agalma*, Miq. in Bonplandia, 1856, p. 138; Fl. Ned. Ind. i. pars i. p. 752, t. 11 et 12.—*Hederæ*, *Paratropiæ*, sp. auct.

Miquel wished to confine the genus *Agalma* to those species which have truly racemose flowers, represented typically by *A. rugosum* (*Aralia rugosa*, Blum.), and it is only in this particular that his *Agalma* differs from his *Paratropia*. Singular as is the inflorescence in *A. rugosum*, *simillimum*, and *racemosum*, few botanists would follow him in thinking that character sufficient to found a genus upon. I have therefore sought for better limits, and, adopting Miquel's two *Agalmas* as the type, added all that agreed generically with them. Most of their congeners had been referred to *Paratropia*, even by Miquel himself, where, on account of their long style, they were quite misplaced. De Candolle established that genus for plants with *sessile stigmas*, and three out of the four species he referred to it have sessile stigmas, the fourth being a species of *Polyscias*, and having long styles. Now *Paratropia*, restricted to the species with sessile stigmas, is identical with *Heptapleurum* of Gærtner; and as the latter was established as early as 1791, that name, quite as appropriate as *Paratropia*, claims the right of priority by thirty-nine years. *Agalma* and *Heptapleurum* have certain features in common, but they differ in several essential points, viz.:—

Agalma. Stylus 1, elongatus.—Arbores plerumque terrestres, floribus viridiusculis.

Heptapleurum. Stigmata ovario immersa, punctiformia.—Arbusculæ epiphytæ, floribus viridiusculis v. sæpe purpureis v. sanguineis.

* *Flores racemosi.* (*Agalma*, Miq.)

1. *A. rugosum*, Miq. in Bonplandia, 1856, p. 138; Fl. Nederl. Ind. i. pars i. p. 752, t. 11.—*Aralia rugosa*, Blum. Bijdr. p. 871. *Polyscias rugosa*, Reinw. Herb. *Hedera rugosa*, De Cand. Prodr. iv. p. 265. *Hedera squarrosa*, Jungh. in Tijdrsch. Nat. Geschied. vii. p. 301; Walp. Rep. ii. p. 432. *Hedera heptaphylla*, Jungh. Itin.—Java, 5–8000 feet above the sea (Horsfield! in Herb. Mus. Brit.; Lobb! in Herb. Hook.; Junghuhn; Blume).

2. *A. simillimum*, Miq. in Bonplandia, 1856, p. 138; Fl. Ned. Ind. l. c.—*Hedera simillima*, De Cand. Prodr. iv. p. 265. *Aralia simillima*, Blum. Bijdr. p. 871. *Hedera rugosa*, Reinw. Herb.—Java (Reinwardt).

3. *A. racemosum*, Seem. mss. in Herb. Mus. Brit.—*Hedera racemosa*, Wight Icon. Plant. t. 1015. Ootacamund (Wight); Ceylon (Thwaites! n. 549, in Mus. Brit.; Walker! in Herb. Hook.); Nilgherries (Gardner! Hohenacker!)

** *Flores umbellati.*

4. *A. octophyllum*, Seem. mss.—*Aralia octophylla*, Lour. Fl. Cochinch. (ed. Willd.) p. 233; De Cand. Prodr. iv. p. 258. *Paratropia Cantoniensis*, Hook. et Arn. Bot. Beech. n. 189; Walp. Rep. ii. p. 433.—Cochinchina (Loureiro!); Kakeah Isle (Wright! n. 101); Canton (Lord Macartney!); Macao (David Nelson!); Hongkong (Seemann! n. 2456, Hance! Urquhart! Wilford! Hinds! Champion!); Foochoo (Swinhoe!).

5. *A. aromaticum*, Seem.—*Paratropia aromatica*, Miq. in Bonplandia, 1856, p. 139, Fl. Ned. Ind. l. c. p. 760, t. 12. *Aralia aromatica*, Blum. Bijdr. p. 871, exclud. var. *Hedera aromatica*, De Cand. Prodr. iv. p. 265.—Java (Blume! Junghuhn! in Herb. Hook).

6. *A. Horsfieldii*, Seem.—*Paratropia Horsfieldii*, Miq. in Bonplandia, 1856, p. 139, Fl. Ned. Ind. l. c. p. 761.—Java (Horsfield! in Mus. Brit.).

7. *A. rostratum*, Seem.—*Hedera rostrata*, Wight, Icon. t. 1013–14; Walp. Ann. i. p. 359; Sikkim (Hooker fil. et Thomson!); Nilgherries (Gardner!).

8. *A. æsculifolium*, Seem.—*Hedera æsculifolia*, Wall. Cat. n. 4913; G. Don, Gen. Syst. iii. p. 394; Walp. Rep. ii. p. 432; Nepal (Wallich! n. 4913; Strachey et Winterbottom! n. 3).

9. *A. tomentosum*, Seem.—*Panax tomentosum*, Wall. ex De Cand. Prodr. iv. p. 254. *Hedera tomentosa*, Ham. in Don Fl. Nep. p. 187; De Cand. Prodr. iv. p. 264; Wall. Cat. n. 4922. *Paratropia Wallichiana*, C. Koch, Wochenschrift, 1859, p. 365.—Nepal (Hamilton-Buchanan! Wallich, Cat. n. 4922); Sikkim (Hooker fil. et Thomson!); Bootan (Griffith! n. 2068).

10. *A. elatum*, Seem.—*Hedera elata*, Ham. in Don, Fl. Nepal, p. 187; De Cand. Prodr. iv. p. 264.—Nepal (Hamilton-Buchanan! in Mus. Brit.; Wallich! Cat. n. 4914; Strachey et Winterbottom! n. 5).

11. *A. lucescens*, Seem.—*Paratropia lucescens*, Miq. in Bonplandia, 1856, Fl. Ned. Ind. l. c. p. 754. *Hedera lucescens*, De Cand. Prodr. iv. p. 265. *Aralia lucescens*, Blum. Bijdr. p. 272.—Java (Blume).

12. *A. glaucum*, Seem. sp. nov.; foliis digitatim 7-foliolatis, foliolis petiolulatis obovato-oblongis acuminatis integerrimis, basi obtusis v. attenuatis glabris subtus glaucis, floribus umbellatis, umbellis racemoso-paniculatis, junioribus albido-tomentosis.—Khasia (Hooker fil. et Thomson!).

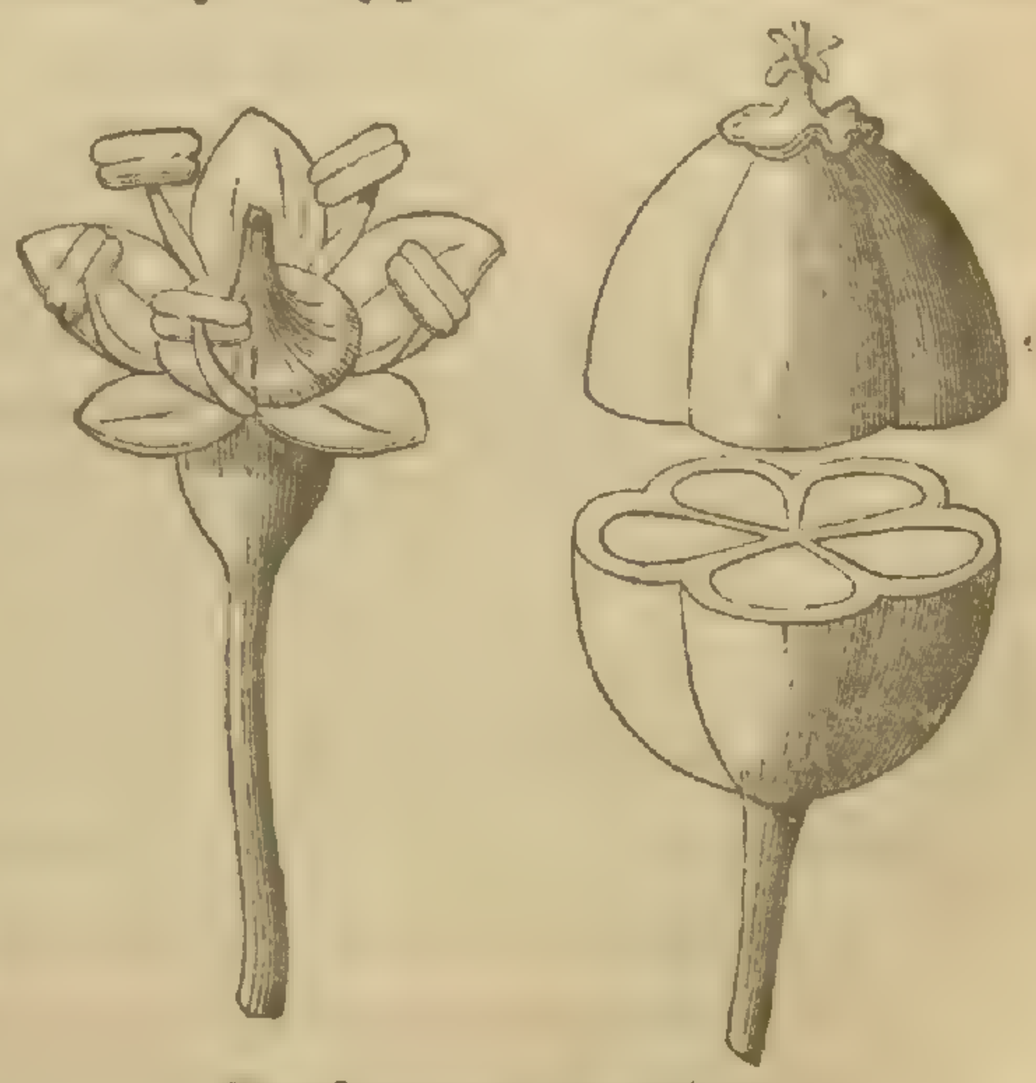
Foliola 6–7-poll. longa, 1–1½ poll. lata; petioluli ½–1½ poll. longi; venæ 10–12.

13. *A. Griffithii*, Seem. sp. nov.; foliis digitatim 7-foliolatis glabris, foliolis ovato-oblongis v. oblongis cuspidatis, integerrimis v. obscure denticulatis, basi subcordatis v. obtusis, supra viridibus lucidis, subtus subglaucis, floribus umbellatis, ramulis pedunculis pedicellis calycibusque ferrugineo-furfuraceo-tomentosis.—Bootan (Griffith! n. 2064).

Petioluli 1 poll. longi; foliola 4 poll. longa, 2–2½ poll. lata; venæ 7–9.

14. *A. redivivum*, Seem. n. sp.; scandens, epiphytum, foliis digitatim 4–5-foliolatis, foliolis longissime (3–3½ poll. long.) petiolulatis, ellipticis v. oblongo-ellipticis longe acuminatis, remote dentatis, basi attenuatis, umbellis brevissime pedunculatis, racemosis, pedunculis pedicellis calycibusque tomentosis, floribus 7–8-meris.—Bangermassing, Borneo (Motley!, n. 1130, in Herb. Hook.).

When gathering his specimens, Motley stripped off and left on the ground some leaves, and on revisiting the spot their petioles were found to have made roots, some of which are in Hooker's Herbarium. Leaf-stalks 1½ foot long; leaflets, including the petiolules, 1 foot long and from 4–5 inches broad; racemes 1 foot long.



Dendropanax cuneatum.

XIV. DENDROPANAX, Dcne. et Planch. Pedicelli inarticulati. Flores ecalyculati, polygamo-monoici. Calyx tubo obconico, limbo 5–6-dentato. Petala 5–6, ovato-triangularia, 1-nervia,

æstivatione valvata. Stamina 5–6, antheræ oblongæ. Stylus 1; stigma 5-lobatum. Ovarium 5-loculare, loculis 1-ovulatis. Drupa baccata, subglobosa, obtuse 5-angularis, 5-pyrena. Albumen æquabile.—Arbores inermes Asiæ et Americæ tropicæ et subtropicæ, foliis simplicibus integris coriaceis, umbellis terminalibus, simplicibus v. compositis, floribus pedicellatis, viridiusculis v. albidis.—*Dendropanax*, Dcne. et Planch. Rev. Hortic. 1854, p. 107; Planch. Hort. Donat. p. 8. *Hederæ*, sp. auct.

* *Umbellis simplicibus.*

1. *D. pendulum*, Dcne. et Planch. Rev. Hort. 1854, p. 107.—*Hedera pendula*, Swartz, Fl. Ind. Occ. p. 512; Sw. Icon. t. 9; De Cand. Prodr. iv. p. 262; Griseb. Fl. West Ind. i. p. 306.—Mountains of Jamaica, Swartz!, in Mus. Brit.; Wilson! in Herb. Hook.).

2. *D. trilobum*, Seem.—*Hedera triloba*, Gardn. in Hook. London Journ. iv. p. 105; Walp. Rep. v. p. 926.—Forests of Organ Mountains, Brazil, 4000 feet elevation (Gardner!, n. 433, in Mus. Brit. et Herb. Hook.).

3. *D. nutans*, Dcne. et Planch. Rev. Hort. 1853, p. 107.—*Hedera nutans*, Swartz, Fl. Ind. Occ. p. 514; De Cand. Prodr. iv. p. 262; Griseb. Fl. West Ind. i. p. 306.—Mountains of Jamaica (Swartz!, in Mus. Brit.; Alexander!, in Herb. Hook.).

Dr. Alexander Prior's specimen is a very fine one; blade of the leaf $2\frac{1}{2}$–$3\frac{1}{2}$ inches long, 2–$2\frac{1}{2}$ inches broad, leaf-stalk 3–4 inches long. Flowers large for the genus. "A tree 40–50 feet high," Alexander.

4. *D. Darienense*, Seem. n. sp.; ramis cinereis, foliis longe petiolatis ovato-oblongis v. obovato-oblongis, acuminatis, basi acutis, venis costatis 4–5, 2 infimis angulo acuto ortis, umbellis solitariis longe pedunculatis, circ. 30-floris, pedunculis inarticulatis, pedicellis filiformibus elongatis.—*Hedera pendula*, Seem. Bot. Herald, p. 132, non Swartz.—By rivulets, Cape Corrientes, Darien (Seemann!, n. 1103, in Mus. Brit. et Herb. Hook.).

Petioles 1–2 inches long. Leaves coriaceous; blade 4–5 inches long, 2–$2\frac{1}{2}$ inches broad; peduncles $2\frac{1}{2}$ inches long, erect; pedicels very slender, $1\frac{1}{2}$–2 inches long; calyx-tubes obconical; styles ultimately divided on the top and recurved. A comparison of my Darien plant with Swartz's authentic specimen of *Hedera pendula* at once

proved their specific differences. The extreme length of the pedicels distinguishes *D. Darienense* at first sight from all its allies.

5. *D. proteum*, Benth. Fl. Hongk. p. 136.—*Hedera protea*, Champ. in Kew Journ. iv. p. 122 ; Hongkong (Champion ! Wright !).

6. *D. parviflorum*, Benth. Fl. Hongk. p. 137.—*Hedera parviflora*, Champ. in Kew Journ. iv. p. 122.—Hongkong (Champion !).

7. *D. Japonicum*, Seem.—*Hedera Japonica*, Jungh. Nov. Gen. et Sp. Plant. p. 25, n. 22 ; Walp. Rep. ii. p. 431.—Japan, not Java as stated by Walp. (Blume ! in Herb. Benth.).

8. *D. ovatum*, Seem.—*Hedera ovata*, Wall. Cat. n. 4911 ; G. Don, Gen. Syst. iii. p. 392 ; Walp. Rep. ii. 431.—Madras (Wallich ! n. 4911).

Though the bulk of species belonging to *Dendropanax* is American, the admission of *Hedera protea*, *parviflora*, *ovata*, and *Japonica*,—four Asiatic species,—is justified by their agreeing in every respect with the definition now adopted for the genus.

** *Umbellis compositis.*

9. *D. Juergenseni*, Seem. n. sp. ; glabrum, foliis ovato-oblongis v. oblongis acuminatis integerrimis, basi attenuatis, venis pinnatis horizontaliter divergentibus, umbellis terminalibus compositis, ramis (pedicellis primariis) medio articulatis bracteatis, pedicellis (secundariis) basi bracteolis minutis ferrugineis instructis.—Sierra San Pedro Nolasco, Mexico (Jürgensen ! n. 729 in Herb. Hook.).

Allied to *D. arboreum*, but all the veins diverge horizontally from the midrib, even the lowermost. Leafstalk 2–3 inches long ; largest leaf-blade 7 inches long, 4 inches broad, and having 11–12 veins on each side of the costa.—In *D. arboreum* the two lowermost veins form an acute angle with the midrib, the same is the case in *D. cuneatum*.

10. *D. Fendleri*, Seem. mss. n. sp. ; glabrum, robustum, foliis longe petiolatis ovatis acuminatis integerrimis crasse coriaceis, basi 3–5-nerviis, supra viridibus lucidis, subtus pallidioribus opacis, umbellis terminalibus compositis, pedicellis inarticulatis, floribus . . . , drupa baccata (nigra) 5-angulata 5-pyrena, stylis 5 basi arcte connatis apice divaricatis coronata.—Tovar, Venezuela (Fendler ! n. 529).

Petiole 3 inches long ; bladė 4–5 inches long, 3–3½ inches broad ; drupe ¾ of an inch across.

11. *D. arboreum*, Dcne. et Planch. Rev. Hortic. 1854, p. 107.—*Hedera arborea*, Swartz, Fl. Ind. Occ. p. 518 ; De Cand. Prodr. iv. p.

262. *Aralia arborea*, Linn. Am. Ac. v. p. 369; Jacq. Hort. Schœnb. t. 51. *Hedera alaris*, Schlecht. Linnæa, ix. p. 605; Walp. Rep. ii. p. 431. *Dendropanax alare*, Dcne. et Planch. l. c. *Sciadophyllum Jacquini*, Griseb. Fl. West Ind. i. p. 306.—Jamaica (Swartz! Masson! Wright! Macfadyen! Purdie! March! Wilson! Alexander! Hartweg! n. 1544); Island of St. Vincent (Anderson!); Isthmus of Panamá (Seemann!, n. 1171; Fendler! n. 131; Hayes!); Central America (Shakespear!); Cuba (Wright! n. 212); Bogotá (Triana!); Mexico (Jürgensen! n. 63, Botteri! F. Mueller! Lay and Collie!)

12. *D. cuneatum*, Dcne. et Planch. Rev. Hort. 1854, p. 107.—*Hedera cuneata*, Dc Cand. Prodr. iv. p. 262. *Aralia umbellata*, Pohl, in lit. *Dendropanax Sellowianum*, Miq. in Ann. Mus. Lugd. Bat. i. p. 27?—Brazil (Gardner! n. 4704; Claussen! Herb. Mus. Brit.; Sellow!, n. 1270); Rio Uaupé (Spruce! n. 2860).

13. *D. ramiflorum*, Seem.—*Hedera ramiflora*, Dc Cand. Prodr. iv. p. 262. *Aralia ramiflora*, Pohl, in lit. *Hedera resinosa*, Benth. mss. in Plant. Sprucean.—Rio Negro, N. Brazil (Spruce! nos. 2350, 2337, 2349).

14. *D. tomentosum*, Seem.; robustum, ramis crassis tomentosis mox glabratis, foliis obovato-oblongis acutis mucronatis, basi cuneatis, supra glabris lucidis, subtus dense ferrugineo-tomentosis, floribus racemosis v. umbellis racemosim paniculatis, pedunculis petiolis calycibus petalisque ferrugineo-tomentosis, pedicellis brevissimis.—Minas Geraes (Gardner! n. 4703; Claussen! in Mus. Brit.).

Petioles ½–1 inch long. Blade of leaf thick, coriaceous, from 3–5 inches long, 1½–2 inches broad. Veins 7–8, on each side of the midrib.

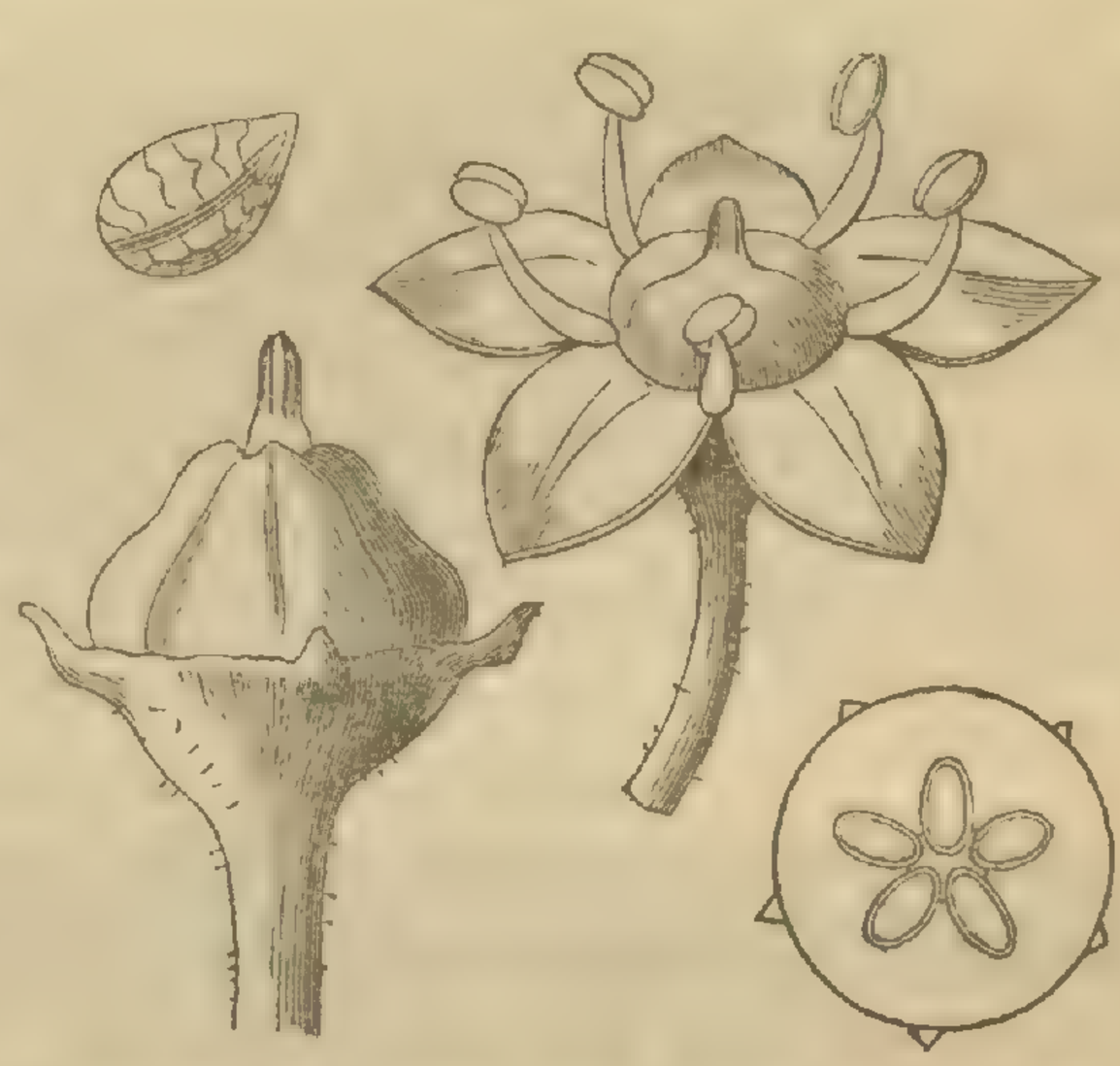
*** *Species indescriptæ.*

15. *D. montanum*, Dcne. et Planch. l. c.
16. *D. lanceolatum*, Dcne. et Planch. l. c.
17. *D. obovatum*, Dcne. et Planch. l. c.
18. *D. oblongum*, Dcne. et Planch. l. c.
19. *D. densiflorum*, Dcne. et Planch. l. c.
20. *D. lancifolium*, Dcne. et Planch. l. c.
21. *D. citrifolium*, Dcne. et Planch. l. c.

**** *Species exclusa.*

D. Pavonii, Dcne. et Planch. l. c. (*Aralia umbellata*, Herb. Pav.)= *Gilibertia umbellata*, Ruiz et Pavon.

XV. HEDERA, Linn. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calyx tubo obconico, limbo 5-dentato. Petala 5, ovato-triangularia, 1-nervia, libera, æstivatione valvata. Stamina 5; antheræ oblongæ. Ovarium 5-loculare, loculis 1-ovulatis. Stylus 1, elongatus; stigma obscure 5-lobatum. Drupa baccata, subglobosa, lævis, 5-pyrena. Albumen ruminatum. Embryo magnus.—Frutices sarmentosi inermes Europæ, Asiæ et Africæ indigenæ, foliis exstipulatis simplicibus palmatim lobatis v. integris, umbellis racemosim v. paniculatim dispositis, floribus viridiusculis, drupis nigris flavis v. albidis.—*Hedera*, Linn. Gen. n. 395 (ed. Schreb.); De Cand. Prodr. iv. p. 261, excl. sp.; Koch, Synops. Fl. Germ. p. 321.



Hedera Helix (*partly after Nees von Esenbeck*).

Whether there is only one species or several mixed up with the plants which now go in gardens and herbaria under the name of *Hedera Helix*, and make up the genus *Hedera*, as now circumscribed, and whether one or two species are indigenous to the British Islands are still open questions. No botanist has, as yet, been successful in finding good characters for what have been considered as species; and though all other *Hederaceæ* have a limited geographical range, *Hedera Helix* is supposed to be an exception to this rule, and to be spread over three continents, Europe, Asia, and Africa, from the Canary Islands to Japan, and that this circumstance alone sufficiently accounts for the numerous existing varieties. After carefully investigating the subject, and examining every specimen I could lay my hands on, aided by contributions from botanical friends, I have arrived at a different conclusion. I can clearly distinguish three distinct species, which, though having each many varieties, do not run into each other, and have each a distinct geographical range. If these different species had to be named anew, I would propose to call them respectively the European, the African, and the Asiatic.

The European Ivy is *Hedera Helix*, Linn. It is not found out of Europe, and may at once be known by its uppermost leaves being ovate or elliptical, its umbels arranged in simple racemes, and its pedicels and calyx being covered with white stellate hair, the hair having from 6–8, but never more, rays. From time immemorial a variety with white and yellow variegated leaves has been cultivated in gardens; even Pliny mentions it; indeed it is one of the oldest, if not the oldest, variegated garden plant of which we have any record. The fruit of *Hedera Helix* in northern Europe is generally black; in Germany it occurs occasionally with white; and in European Turkey, Greece, and Italy with yellow berries. The black-fruited kind has always been considered as the true *H. Helix*, and the white as a variety of it, which indeed it is; but the yellow has been made, I think, unjustly into a distinct species, and named *H. poetarum* by Bertoloni, and some time previously *H. chrysocarpa* by Walsh. It is the latter plant which played so important a part in ancient Greece and Rome, its leaves supplying the materials for the wreaths with which poets were crowned, and at the festivals in honour of Dionysos all casks, vessels, amphoras, etc. were decorated; it was customary even to lie and sit upon ivy branches on those occasions.* It is believed traditionally that the yellow-fruited Ivy came from India with the worship of Bacchus; and the fact that the Nepal Ivy described by Wallich has yellow fruit is regarded as a proof of the correctness of this tradition. But a close examination of the European yellow-fruited plant shows that it is specifically identical with *H. Helix*, and specifically different from the Nepal and all other Asiatic specimens. If the worship of Dionysos gradually crept from India to Greece and Rome, and a yellow-fruited Ivy was deemed essential to its proper performance, there was no need of carrying the Asiatic plant into Europe, as an indigenous variety (*chrysocarpa=poetarum*) occurred at the very threshold; whilst the Asiatic Ivy, as we shall presently see, is spread from the central highlands to the most western confines of Asia,—to ancient Colchis.

H. Helix.

The African Ivy is *Hedera Canariensis*, Willd. It is found in the Canary Islands, Madeira, and the north of Africa, and may at once

* For further particulars, see C. Bötticher, 'Baumkultus der Hellenen' (Tree-worship of the Hellenes), Berlin, 1856, 8vo, p. 333.

be known by its uppermost leaves being cordate, its umbels arranged in panicles, rarely and only in young plants in simple racemes, and its pedicels and calyx being covered with white stellate hair, the hair having from 13–15 rays. To this must probably be referred what is called in gardens Scotch or Irish Ivy. It is a much quicke-rgrowing plant than *H. Helix*, and on that account more frequently planted in gardens, but is much more susceptible to cold, and in Germany often killed by frost. At some time or other this species is said to have been introduced into Ireland, and has hence received the name of *Helix Hibernica* in our gardens; but I have not been able to learn anything authentic about this introduction, or whether it has been introduced at all. At present, Dr. Moore, of Glasnevin, informs me it is found, to all intents and purposes, wild in various parts of Ireland, growing together with *H. Helix*, and far away from cultivation. Mackay, no great authority in critical plants it is true, also mentions it as having been found in Ireland. I have not been able to examine any specimens of wild Irish Ivy, and our British Floras do not afford any information respecting it.

Hair of *H. Canariensis.*

The Asiatic Ivy is *Hedera Colchica*, C. Koch. It is not found out of Asia, and may be known by its uppermost leaves being elliptical or lanceolate, its umbels arranged in simple racemes, and its pedicels and calyx being covered with yellowish 2-lobed scales, the lobes being opposite each other, and divided into 7–10 segments. Our first knowledge of this plant is derived from Kæmpfer, who, two centuries ago, found it in Japan, where it is called "Fotogi Tsta (*i. e.* simulacri seu idoli *Hedera*)." It was afterwards gathered by Wallich and other collectors in the Himalaya Mountains, by Fortune in Northern China, by Wright in the Loochoo Islands, and by C. Koch in the trans-Caucasian countries. Wallich was the first to describe the plant, though he did not venture to separate it from *H. Helix;* in fact, the important character furnished by the scales escaped him. It was not until 1859 that C. Koch, who had seen it wild, named it *Hedera Colchica*, and gave a correct diagnosis of it. It is owing to an authentic specimen kindly transmitted by him that I am able to identify this new species with the Asiatic Ivy,—as I am indebted to the Rev. R. T. Lowe for a sight of the Madeira Ivy. *Hedera Colchica* is now

Scales of *H. Colchica.*

an inmate of our gardens, it having been found on the Caucasian coast of the Black Sea, by Mr. Rœgner, formerly Curator of the Botanic Gardens of Odessa. Thus it found its way into our gardens, occurring here and there under the (I believe unpublished) name of *Hedera Rœgneriana*. The only two popular accounts of this plant are given by Wallich and C. Koch. In Nepal it is called Sagooke or Gooke (*i. e.* the climber), "and is," says Wallich (Roxb. Fl. Ind. ii. p. 515), one of the most common, as well as the most noble productions of Nepal, where it grows to a majestic size, and extends over trees and rocks." In Transcaucasia, on the contrary, it is more stunted than the European Ivy, having reached its western geographical limit; "and," says C. Koch ('Wochenschrift,' 1859, p. 76), "I have never seen it ascend the tops of the numerous Beeches of that country, whilst the common Ivy climbed to the highest branches."

Though there are several important peculiarities to distinguish the three species, the most ready way to make sure of them is to look at the character furnished by the hairs and scales. They are largest in *H. Helix*, where they may be seen distinctly with a common pocket lens; but in the two other species it requires a greater magnifying power to make their nature quite intelligible.

Pilis pedicelli et calycis stellato-6–8-radiatis	*H. Helix.*
Pilis pedicelli et calycis stellato-13–15-radiatis . . .	*H. Canariensis.*
Squamis pedicelli et calycis bilobis, lobis 7–10-fidis . .	*H. Colchica.*

1. *H. Helix*, Linn. Sp. 292; Koch, Synops. Fl. Germ. p. 321; Sowerby, Engl. Bot. t. 1267; De Cand. Prodr. iv. p. 261, ex parte. —*H. communis*, S. F. Gray, Natural Arrang. of British Plants (1821), p. 491.—Europe.

Var. α. *melanocarpa*, Seem., baccis nigris. Engl. Bot. t. 1267. —*Hedera Helix*, var. *vulgaris*, De Cand. Prodr. l. c.—Common in Northern Europe, and varying with white and yellow blotched leaves. Or does the white-leaved form belong to the following variety and the yellow-leaved to γ. *chrysocarpa?* Has any one ever seen them in fruit?

Var. β. *leucocarpa*, Seem., baccis albis.—In Germany, rare.

Var. γ. *chrysocarpa*, Ten. in Caruel, Fl. Tosc. p. 300, non De Cand. —Baccis flavis. *Hedera chrysocarpa*, Walsh in Trans. Hort. Society of London, vi. 42 (1826). *H. poetarum*, Bertol. Prælectiones rei Herb. p. 78 (1827). *H. poetica*, Casp. Bauh. Pin. 305. *H. Dionysias*, J. Bauh. Hist. Ic. *Hedera chrysocarpos*, seu *Dionysiacos veterum*.

Ederæ genus *chrysocarpon*, Plin. Hist. *Kissos* of the ancient Greeks. —European Turkey, Greece (Heldreich!), and S. and Central Italy.

2. *H. Canariensis*, Willd. in Berl. Mag. ii. p. 170. t. 5. f. 1; Schult. Syst. v. p. 508.—*H. Helix*, var. (?) *Canariensis*, De Cand. l. c. *H. Helix*, Lowe, Fl. Mad. p. 376, non Linn. *H. corymbosa*, Chois. in De Cand. Prodr. l. c. p. 262? *H. Hibernica* v. *Scotica* hortulanorum? —Algiers, Madeira (Lowe!), and Canary Islands (Bourgeau!), and (?) Ireland.

3. *H. Colchica*, C. Koch, 'Wochenschrift,' 1859, p. 76.—*H. Helix*, var. *Colchica*, C. Koch in Linnæa . . .; Regel, Gartenflora, 1862, tab. 360. *H. Helix*, Don, Fl. Nep. p. 187; Wallich in Roxb. Fl. Ind. ii. p. 515. *H. Helix*, var. (?) *chrysocarpa*, De Cand. Prodr. iv. p. 261, exclud. syn. Bauh. et Dalechamp. *H. Helix*, Thunb. Fl. Jap. p. 102. "Fotogi Tsta, *i. e.* simulacri seu idoli *Hedera*. *Hederæ* arbores communes bacciferæ," Kæmpf. Amœn. Exot. Fasc. v. p. 887. *H. rhombea*, Sieb. et Zucc. in Abhand. Bayer. Akad. Math. Ph. Cl. vol. iv. p. 202, sine descript.—Japan (Thunberg! in Mus. Brit.); Loochoo (Wright! n. 102); N. China (Fortune! n. 60); Bootan (Griffith! n. 2076, in Mus. Brit.); Nepal (Hamilton! in Mus. Brit.; Wallich! Strachey et Winterbottom!); Khasia (Hooker fil. et Thomson!); Sikkim (Hooker fil. et Thomson!); Transcaucasia (C. Koch!); Black Sea, shores of Caucasia (Roegner).

Species exclusæ :—

H. acerifolia, De Cand.=*Oreopanax*.
H. aculeata, Ham.=*Brassaiopsis aculeata*, Seem.
H. acuminata, Wight=*Polyscias acuminata*, Seem.
H. acutifolia, De Cand.=
H. æsculifolia, Wall.=*Agalma æsculifolium*, Seem.
H. alaris, Schlecht.=*Dendropanax arboreum*, Dcne. et Planch.
H. angularis, De Cand.=*Oreopanax*.
H. arborea, Sw.=*Dendropanax arboreum*, Dcne. et Planch.
H. argentea, De Cand.=*Oreopanax argenteum*, Dcne. et Planch.
H. aromatica, De Cand.=*Agalma aromaticum*, Seem.
H. Australiana, F. Müller=*Nothopanax?*
H. avicenniæfolia, De Cand.=*Oreopanax avicenniæfolium*, D. et Pl.
H. capitata, Smith=*Oreopanax capitatum*, Dcne. et Planch.
H. catalpæfolia, De Cand.=*Oreopanax catalpæfolium*, D. et Pl.
H. cheirophylla, De Cand.=*Oreopanax*.

H. crassinervia, De Cand.=*Oreopanax crassinervium*, Dcne. et Planch.
H. (?) Cumanensis, De Cand.=*Oreopanax Cumanense*, D. et Pl.
H. cuneata, De Cand.=*Dendropanax cuneatum*, Dcne. et Planch.
H. discolor, De Cand.=*Oreopanax discolor*, Dcne. et Planch.
H. disperma, De Cand.=*Macropanax oreophilum*, Miq.
H. Echinops, G. Don=*Oreopanax Echinops*, Dcne. et Planch.
H. elata, Ham.=*Agalma elatum*, Seem.
H. ferruginea, De Cand.=*Sciadophyllum*.
H. ferruginea, Wall.=*Trevesia*.
H. floribunda, De Cand.=*Oreopanax floribundum*, Dcne. et Planch.
H. floribunda, Wall.=*Brassaiopsis floribunda*, Seem.
H. fragrans, D. Don=*Pentapanax Leschenaultii*, Seem.
H. fragrans, Spr.=*Heteropanax fragrans*, Seem.
H. Gaudichaudii, A. Gray=*Cheirodendron*.
H. glauca, Wall.=*Pentapanax parasiticum*, Seem.
H. glomerulata, De Cand.=*Brassaiopsis speciosa*, Dcne. et Planch.
H. Hainla, Ham.=*Brassaiopsis Hainla*, Seem.
H. heptaphylla, Jungh.=*Agalma rugosum*, Miq.
H. heterophylla, Wall.=*Heptapleurum heterophyllum*, Seem.
H. hypoglauca, Hance=*Vitis Cantoniensis*, Seem.
H. Jackiana, G. Don=*Arthrophyllum*.
H. Japonica, Jungh.=*Dendropanax Japonicum*, Seem.
H. jatrophæfolia, De Cand.=*Oreopanax jatrophæfolium*, Dc. et Pl.
H. latifolia, Wight et Arn.=Gen. nov. (?).
H. Leschenaultii, Wight et Arn.=*Pentapanax Leschenaultii*, Seem.
H. lucescens, De Cand.=*Agalma lucescens*, Seem.
H. multiflora, De Cand.=
H. Mutisiana, De Cand.=*Oreopanax Mutisiana*, Dcne. et Planch.
H. nutans, Sw.=*Dendropanax nutans*, Dcne. et Planch.
H. obovata, Wight=*Heptapleurum stellatum*, Gærtn.
H. obtusiloba, De Cand.=*Oreopanax obtusilobum*, Dcne. et Planch.
H. ovata, Wall.=*Dendropanax ovatum*, Seem.
H. palmatum, Wall.=*Trevesia*.
H. parasitica, Don=*Pentapanax parasiticum*, Seem.
H. parviflora, Champ.=*Dendropanax parviflorum*, Bth.
H. pendula, Sw.=*Dendropanax pendulum*, Dcne. et Planch.
H. platanifolia, De Cand.=*Oreopanax platanifolium*, D. et Pl.
H. platyphylla, A. Gray=*Cheirodendron*.

H. polyacantha, Wall.=*Brassaiopsis Hainla*, Seem.
H. protea, Champ.=*Dendropanax proteum*, Bth.
H. quinquefolia, Linn.=*Ampelopsis hederacea*, De Cand.
H. racemosa, Wight=*Agalma racemosum*, Seem.
H. ramiflora, De Cand.=*Dendropanax ramiflorum*, Seem.
H. reticulata, De Cand.=
H. rostrata, Wight=*Agalma rostratum*, Seem.
H. rugosa, De Cand.=*Agalma rugosum*, Miq.
H. scandens, De Cand.=*Brassaiopsis Hainla*, Seem.
H. Sciadophyllum, Swartz=*Sciadophyllum Brownei*, Spr.
H. sessiliflora, Bth.=*Oreopanax sessiliflorum*, Dcne. et Planch.
H. septemnervia, De Cand.=*Oreopanax septemnerve*, Dcne. et Planch.
H. simillima, De Cand.=*Agalma simillimum*, Miq.
H. Soluensis, Steudl.=*Trevesia*.
H. squarrosa, Jungh.=*Agalma rugosum*, Miq.
H. subcordata. Wall.=*Pentapanax subcordatum*, Seem.
H. terebinthacea, Vahl=*Heptapleurum stellatum*, Gærtn.
H. terebinthacea, Wall.=*Heptapleurum venulosum*, Seem.
H. tomentosa, Ham.=*Agalma tomentosum*, Seem.
H. trifoliata, Wight et Arn.=*Pentapanax Leschenaultii*, Seem.
H. triloba, Gardn.=*Dendropanax trilobum*, Seem.
H. Turbacensis, De Cand.=*Oreopanax Turbacense*, Dcne. et Planch.
H. umbellifera, De Cand.=*Osmoxylon Amboinense*, Miq.
H. undulata, Wall.=*Macropanax undulatum*, Seem.
H. unifolia, Arrab.=
H. verticillata, Zippl.=*Heptapleurum verticillatum*, Seem.
H. Wallichiana, Steudl.=*Brassaiopsis floribunda*, Seem.
H. Halapensis, De Cand.=*Sciadophyllum*.

(*To be continued.*)

OBSERVATIONS ON THE RICE-PAPER TREE, *TETRAPANAX PAPYRIFERUM*, *C. Koch*; ITS INTRODUCTION AND NATURALIZATION IN SYDNEY, N. S. WALES.

By George Bennett, M.D., F.L.S., etc. etc.

The Rice-paper tree (*Aralia? papyrifera*, Hook., or more correctly *Tetrapanax papyriferum*, C. Koch) is now successfully naturalized in New

South Wales. I published the first figure of this tree in my 'Wanderings in N. S. Wales, Singapore, and China' (vol. ii. p. 77) in the year 1834. The engraving was made from a large coloured drawing by a Chinese artist, and procured for me by the late Mr. Beale, of Macao, who interested himself in my inquiries respecting the tree that produced the material known as "Rice Paper," but at that time all my efforts to procure plants were in vain; specimens of the pith of the tree in its unprepared state, and the sketch before mentioned, were all I could obtain. The name given to this tree I ascertained was Tong, there. On submitting the drawing, on my arrival in England, to Mr. A. B. Lambert and Mr. David Don, they expressed an opinion that the rice-paper plant would most probably prove to be a species of *Aralia*. In 1850 Dr. Seemann, on visiting Southern China, obtained a translation of the account which the Chinese themselves give of the plant in the Materia Medica of Li-shi-chin (Hook. Kew Journ. iv. p. 25), from which we learn that the plant is called Tung-toh-muh or sometimes Tung-tsau (*i. e.* the hollow plant). In 1852 living plants were procured by the exertions of Sir John Bowring, and my Chinese drawing was then found to be an accurate representation of the tree. It has now been ascertained that the tree grows abundantly on the island of Formosa, and is extensively cultivated in various districts of that island; and it is stated by the Chinese to attain the height of from twelve to fourteen feet; also that it is not propagated from seeds, but throws up shoots like the Bamboo from the root, and this account accords with the number of suckers we observe that are thrown up by the tree in N. S. Wales.

The first Rice-paper plant was sent to Sydney, N. S. Wales, by Mr. J. Veitch, jun. (of the Royal Exotic Nursery at Chelsea), to Mr. C. Moore, the Director of the Botanical Gardens, and by whom, shortly after its arrival in November, 1857, (one of the early summer months in Australia) was planted out in the open grounds of the Botanical Garden. It grew very rapidly, and soon began to throw up a considerable number of suckers; indeed, so many, that after giving away numerous specimens to the botanist of the Austrian frigate 'Novara,' and taking ten in a dried state myself to England for the Herbarium, the whole of the numerous plants now growing in the colony have been produced from this tree. On the 26th of April, 1858, it had attained the height of 3 feet 8 inches, and a circumference of foliage of

26 feet, and was producing so many suckers that it soon became evident that there would be no difficulty in propagating so prolific a plant very extensively, as the result has proved. About the second year (1859) it displayed some fine panicles of flowers, and died soon after. From not being at this time acquainted with the habits of this interesting tree, it was at first supposed that it perished soon after flowering, leaving a numerous progeny in suckers; but the trees that flowered afterwards not dying negatived this opinion, and it has been since ascertained that it commences to blossom, the second year of its growth, and flowers regularly every year afterwards. About the end of May and in June, the early winter months in N. S. Wales, the Botanic and other gardens at Sydney are adorned and enlivened by these trees attracting the attention of visitors by their luxuriant canopy of broad foliage (as seen in the enclosed drawing from nature by Mr. W. E. Bennett), the beautiful head of large leaves being surmounted by numerous wand-like panicles of blossoms, consisting of numerous small flowers. The flowers are of a very pale-yellowish white colour, but when viewed in certain directions appear greenish or greenish-yellow, probably arising from reflected light, either from its own foliage or from that of the trees in its immediate vicinity. These masses of flowers which crowned the luxuriant foliage were very inconspicuous when examined in single clusters, but, as a whole, the panicles of blossoms on their white flowering stems had a beautiful effect when contrasted by the dark-green palmated foliage, the latter so widely spread, and in one of the trees 8 feet high, capable of affording an agreeable shade to any one standing under the leafy canopy: there were ten to twelve fine panicles of blossoms on each tree when in bloom.

The Rice-paper tree may now be considered naturalized in N. S. Wales, growing abundantly and in the greatest luxuriance since its introduction in 1857 to 1864, so much so as in the garden to have become almost troublesome, from its suckers springing up in every direction, and its enormous foliage covering in a short time and impeding the progress of other valuable plants. It has survived the climate, although exposed to the furnace-like blasts of the hot winds, the keen drying westerly winds, and the cold moist southernly gales and the sharp frosts of winter. It even stood, without a single casualty, the long dry weather in 1862, when the heat was so excessive as to brown the foliage of the Bamboo and other tropical trees, and totally

destroy many of the plants of northern climates; their first and bright-green leaves forming an agreeable contrast at that time to the parched and drooping foliage of the trees about them. The flowers of this tree no doubt contain honey, as when in blossom the trees are a source of attraction to the bees, which may be observed at that time humming about the trees in great numbers, hovering over and sucking the blossoms. The pith of this tree, when manufactured by the Chinese into sheets of various dimensions, is used extensively for drawings of birds, butterflies, and other objects of natural history, for which purpose it is well adapted from its peculiar texture; the only objection is the brittle nature of the material requiring most delicate handling and the edges of the drawings require to be bound with ribbon to protect them from injury, otherwise the material is very durable. It is also used in the manufacture of artificial flowers, and it may be very serviceable in New South Wales as a light material for making the solar or pith hats, imported very largely from Calcutta, and now worn so much during the summer months in the colony. This article obtained the name of "rice paper" from its having been supposed that it was manufactured from rice, although an inspection by the microscope very easily decided that it was the delicate medullary portion of a Dicotyledonous stem. This *Araliacea* is very ornamental for gardens and shrubberies, more especially as in this colony it produces its fine panicles of flowers at a season of the year when blossoming plants and trees are comparatively rare, and therefore give a cheerful appearance to the gardens and plantations. On the 3rd of July, 1863, one of the trees was cut down for me by my friend Mr. C. Moore, for the purpose of ascertaining the quantity of pith contained in the stem which would be of any economical use. The total height of the tree was 8 feet, and the length of stem to the bifurcation of the branches was 4 feet $2\frac{1}{2}$ inches, and the age of the tree about four years. From the base to about 21 inches of the bifurcation the hard wood of a white colour was formed, and the fine pith capable of use continued to 14 inches, and measured when detached from the surrounding woody portion $1\frac{1}{2}$ inch in diameter; and when compared with some of the same material from China, was considered equal to it both in quality and size. In the young bifurcated branches the pith was well formed and measured 1 inch in diameter. From $2\frac{1}{2}$ to 3 years will probably be about the best time for cutting down the trees for the purpose of collecting the pith.

The bark of the Rice-paper tree is rough, and the wood hard, heavy, and apparently durable; between the bark and the wood there is secreted a mucilaginous substance, having a strong smell resembling Hemlock. It has been remarked that after the suckers are removed from the parent tree and planted, they do not easily bear transplanting. By the end of June or early part of July the flowers had perished and many abortive fruits were formed; seeds could only be distinguished by a powerful lens. The flowering stem was covered with a white downy substance, which afterwards, when the flowers perished, became of a similar brown colour to the down seen on the footstalks of the leaves and the young foliage just developing itself from the bud. The suckers appear during all seasons of the year, but more profusely after flowering. From the Chinese accounts, the plants attain their full growth in the tenth month, when they are cut down, the leaves removed, and the stems are left to soak for some days in running water to loosen the bark and wood and facilitate the removal of the pith. On examining in Sydney a plant of the growth of one year, which was cut down for the purpose, no pith was found of sufficient size or firmness to be of any economic value; this plant was $4\frac{1}{2}$ feet in height and a circumference of foliage of about 22 feet. The following is the description and measurement of four of the largest trees in the Botanical Garden, taken in April, 1862. The first tree had the main stem 6 feet high, which then divided into two branches, from each of which at the flowering-season six spikes of flowers were produced; the total height of the tree was 10 feet, with a circumference of foliage of 24 feet. Any person could stand erect under the foliage of this tree, sheltered from the sun by the overhanging leaves. This tree was four years old, and flowered every year. The circumference of the centre of the trunk was 8 inches. The trunk of the second tree was 6 feet high and a circumference of $8\frac{1}{2}$ inches, it then divided into two branches; the total height of the tree was 8 feet, with a circumference of foliage of 20 feet. In the third tree the trunk was $4\frac{1}{2}$ feet high, which then divided into two branches; the circumference of the trunk was 10 inches; and the total height $8\frac{1}{2}$ feet, with a circumference of foliage of 22 feet. The fourth tree was of very irregular growth, the main stem clear of foliage was 4 feet 9 inches high, with a circumference of 9 inches, and then divided into two branches, each of which bore during the flowering season from 5 to 6 spikes

of flowers; in all the trees the flowering spikes were generally from 3 to 4 feet in length. This tree was 7 feet high, and the extent of the foliage 18 feet. The usual length of the leaves, including the long foot-stalk, was 4 feet 10 inches to 5 feet; the foot-stalk of the leaves clasps the trunk in a similar manner to the fronds of the Palm, and on dropping off when decayed, leave a mark on the trunk. The soil in which the Rice-paper trees were planted was a sandy loam. Most of the trees are rather straight and handsome in growth, but others are irregular and crooked. The tree flowers annually, and after each time of flowering, forms two new branches. As this tree increases in size and age, after five years it loses all its value for the pith as an object of commercial value, and can only then be regarded as an ornamental tree for the garden or shrubbery. I examined a young tree which was cut down on the 4th of May, 1863, it was two years old, and the trunk, free of foliage, was 3 feet 8 inches high, with a circumference of $4\frac{1}{2}$ inches; the extent of foliage measured 18 feet. I found the pith developed through the whole length of the stem, and no wood had been yet formed at any part, but the pith was not of that firm consistence as in the first tree which was cut down when four years old; the diameter of the pith when removed was 1 inch. On June 10th, 1864, I again measured the trees before mentioned, the first had attained the height of 13 feet, with an extent of foliage of 26 feet; the trunk near the base measured 15 inches in circumference, and at the centre 1 foot. The second tree was 12 feet high, with an extent of foliage of 22 feet; circumference of the trunk near the base 13 inches, in the centre 10 inches. The third tree was 10 feet in height, with an extent of foliage of 26 feet, the circumference of the trunk at the base was 10 inches, and the centre 10 inches. The fourth tree measured in the former account had been cut down.

In the Pharm. Journ. vol. vi. (1864), p. 52, there is the following interesting notice of the plant in question from the pen of Mr. Robert Swinhoe, H.B.M. Consul at Formosa:—

"This plant has as yet only been procured from the northern end of Formosa, where it grows wild in great abundance on the hills. It is of very quick growth, and the trunk and branches, which are lopped for use, are not unlike those of an old Elder in appearance. The cellular tissue or pith attains its full size the first year. The trunks and branches are mostly procured from the aborigines of the inner mountains, in barter for Chinese produce. They are rarely straight throughout their length, and are usually cut into pieces of about nine inches

long, and with a straight stick inserted at one end and hammered on the ground, the pith is forced out with a jump at the other end. The pith is then inserted into straight hollow bamboos, where it swells and dries straight. If too short to form the required breadth of paper, several bits are inserted into a hollow bamboo, and, by rods inserted at both open ends of the bamboo, pressed together until dry. By this process the short bits are forced to adhere together and form one long straight piece of the required length. Thus paper of almost any size can be procured. The knife used in paring the pith into paper is in shape not unlike a butcher's chopper. It is well sharpened on a stone, and when not used, kept with the edge in a wooden groove held firm to it by two strings round the wood and the knife. Before using it, the edge receives a fresh touch up on a small block of wood, usually a piece of the timber of *Machilus ramosa*, shaped like a large hone. The block on which the pith is cut consists of a smooth brick or burnt-clay tile, with a narrow piece of brass on a rim of paper pasted at each edge, on which the knife is laid, and is consequently a little raised above the bare tile itself. The block is laid flat on a table, and the dried pith rolled on it with the fingers of the left hand, and then the knife laid on the brass rims with its edge towards the pith, its handle being held by the right hand. As the knife is advanced leftwards by the right hand, the pith is rolled in the same direction, but more slowly, by the fingers of the left. The paring thus goes on continuously, until the inner pith, about a quarter of an inch in diameter, is left, resembling somewhat the vertebral column of a very small shark, and breaking into similar concave-sided joints. This is used by the Chinese as an aperient medicine. The paring produces a smooth continuous scroll about four feet long, the first six inches of which are transversely grooved and cut off as useless. The rest shows a fine white sheet. The sheets, as they are cut, are placed one upon another and pressed for some time, and then cut into squares of the required size. The small squares made here are usually dyed different colours, and manufactured into artificial flowers for the adornment of the hair of the native ladies; and very excellent imitations of flowers they make. The sheets most usually offered for sale, plain and undyed, are about three inches and a quarter square, and are sold in packets of one hundred each, at rather less than one penny the packet, or a bundle of five packets for fourpence. The larger-sized paper is made to order, and is usually exported to Canton, whence the grotesque but richly tinted rice-paper paintings have long attracted the curiosity of Europeans. Some of us tried our hands at paring, but made most abortive attempts, producing only chips, though the operation looked so easy in the hands of the apprentice. The term of apprenticeship to the trade is three years, during which time the man receives no pay, but only board and lodging from his master, and has to give his services as general attendant besides to his employer. When the three years are completed, the apprentice is required to work other four months, in place of paying premium. He then receives a certificate of capability, and can either set up on his own account or demand wages for hire."

ADDITIONS TO THE LISTS OF HAMPSHIRE PLANTS.

During an excursion made in June last we found Mr. Wise's list of plants for the New Forest (*i. e.* for that part of Hampshire lying between the river Avon and Southampton Water, east and west, and the county of Wilts and the Solent, north and south) full and generally trustworthy. It contains about 680 species and varieties. The chief additional species noticed in June last were :—

Cardamine sylvatica, *Link.*—Perhaps the *C. hirsuta* of Wise's list.
Reseda lutea, *L.*—Lymington.
Viola palustris, *L.*—Small bog near Lyndhurst.
*Viola canina, *L.*, *Bab.*
*Polygala vulgaris, *L.*, and var. depressa, *Wend.*—Both on the heaths.
Malva sylvestris, *L.*—Probably an accidental omission by Mr. Wise.
*Orobus tuberosus, *L.*, var. β. tenuifolius, *Roth.*—Near Brockenhurst.
Rosa tomentosa, *Woods.*—Lymington.
Myriophyllum alterniflorum, *DC.*—Streams in the forest, abundant.
Sedum acre, *L.*—On the walls of Beaulieu Abbey.
Sison Amomum, *L.*—Beaulieu, in hedges.
Pastinaca sativa, *L.*—Brockenhurst.
Leontodon Taraxacum, *L.*, var. δ. L. palustre, *Sm.*—Bog near Brockenhurst.
Veronica polita, *Fries.*—A garden weed at Brockenhurst.
Lithospermum officinale, *L.*—Several large plants in Oakley plantation.
Callitriche platycarpa, *Kütz.*, var. β. C. stagnalis, *Scop.*—Common.
Salix alba, *L.*
Potamogeton polygonifolius, *Pourr.*—Common.
Ruppia maritima, *L.*—Lymington salterns.
Juncus Gerardi, *Lois.*—Lymington salterns.
Luzula multiflora, *Lej.*, chiefly the form L. congesta, *Sm.*—Very common.
Eleocharis palustris, *R. Br.*
E. multicaulis, *Sm.*—One place near Brockenhurst.
Carex stricta, *Good.*—Bogs at Wootton.
C. muricata, *L.*—On the heaths.
C. lævigata, *Sm.*—Boggy copse near Lyndhurst.
*C. filiformis, *L.*—Bog near Holmsley Railway Station.
C. ampullacea, *Good.*—Wootton bogs.
*C. vesicaria, *L.*—New Park enclosure.
*Glyceria plicata, *Fries*, var. β. G. pedicellata, *Towns.*—Lymington.
Festuca ovina, *L.*, var. γ. F. duriuscula, *L.*—Damp places.
Lycopodium inundatum, *L.*—Many places on the damp heaths.
Ranunculus floribundus, *Bab.*, and R. peltatus, *Fries*, are the common aquatic species in the forest streams.
R. cœnosus, *Guss.*, is said certainly to occur in the forest, but the only plant we saw like it was a large form of R. hederaceus, *L.*

R. tripartitus, *DC.*—Only one plant was seen in Mr. Watson's station at Brockenhurst Bridge; this species is very inconstant to its localities.

Tillæa muscosa, *L.*—Mr. Wise's statement that this occurs "everywhere in the forest" is an error, we saw it nowhere but in the well-known locality by the roadside near Stoney-cross Inn.

As in most parts of the South of England the Valerian of the forest agrees better with the description of V. sambucifolia, *Mikan*, than with *V. officinalis*.

The true Orchis latifolia, *L.*, is found at Wootton, and not O. incarnata, *L.*, a species frequently mistaken for it.

Equisetum palustre, *L.*, var. β. polystachion.—We gathered fine examples on the railway bank near Holmsley Station.

The following species, not enumerated by Mr. Wise, were seen in the New Forest district last year (1863):—

Ranunculus circinatus, *Sibth.*—Ditch at Christchurch.

R. fluitans, *Lam.*—River Avon.

Sinapis alba, *L.*

*Sagina ciliata, *Fr.*—Wall at Mudeford.

Acer Pseudoplatanus, *L.*

Erodium cicutarium, *Sm.*

Reseda lutea, *L.*—Mudeford.

Gentiana Amarella, *L.*—In a turfy bog by the roadside on the right-hand, at the entrance on the forest from Christchurch, by the Lyndhurst Road.

Phalaris canariensis, *L.*—Christchurch.

Melica uniflora, *Retz.*—Allum Green, near Lyndhurst.

*Triticum acutum, *DC.*—Mudeford. Common on the Hampshire coast.

In the above lists the plants marked with an asterisk are additional species to those enumerated by Dr. Bromfield in his "Catalogue," in the old series of the 'Phytologist,' at present the only published Flora of Hampshire. The following species, found near Bournemouth last August, are also additions to the county flora as there given:—

Fumaria muralis, *Sond.*—Several places, the only capreolate Fumitory seen in the district.

Ranunculus peltatus, *Fries.*

Viola canina, *L.*, *Bab.*—Abundant on the coast sand-hills.

Arenaria serpyllifolia, *L.*

Ulex nanus, *Forst.*, var. β. U. Gallii, *Planch.*—Very common.

Spergula arvensis, *L.*, var. β. S. vulgaris, *Bœnning.*—Common, to the exclusion of the ordinary form.

Trifolium minus, *Relh.*

Arnoseris pusilla, *Gærtn.*—In a potato-field with *Filago apiculata*, abundant.

Potamogeton perfoliatus, *L.*—River Stour.

Eleocharis, sp.? (E. uniglumis, *Link* ?).—In several places on Poole Heath, and at Boscombe Chine. (I found this plant also in Stokes Bay in 1862, see Phytol. N. S. vol. vi. p. 394.)

Triticum acutum, *DC.*—On the coast. Common.

Lastrea æmula, *Brack.*—At Boscombe Chine and elsewhere.—W. J. Dyer; H. Trimen.

ON PLANTS PRODUCING DOUBLE FLOWERS.

Since publishing my list of plants known to produce double flowers, I have found in my brother's garden at Hanover a Heliotrope with five additional petals. I have also been favoured with several additions by botanical friends and correspondents. Several of these were already enumerated by me under another name, but the following are real additions :—

Caryophylleæ.

Lychnis vespertina, *Sibth.* Europa (A. M'Finlay !).

Malvaceæ.

Malva moschata, *Linn.* Europa (A. M'Finlay !).

Papilionaceæ.

Lotus major, *Scop.* Europa (A. M'Finlay !).

Rosaceæ.

Potentilla anserina, *Linn.* Europ. Amer. et Afr. sept. (A. M'Finlay !).
Geum rivale, *Linn.* Europa, Am. sept. (A. M'Finlay !).

Primulaceæ.

Lysimachia Nummularia, *Linn.* Europa, Am. sept. (A. M'Finlay !).

Convolvulaceæ.

Ipomœa purpurea, *Lam.* Am. austr. (W. G. Smith !).

Borragineæ.

Heliotropium Peruvianum, *Linn.* Peruvia.

Irideæ.

Crocus aureus, *Smith.* Europa (W. G. Smith !).

Orchideæ.

Ophrys aranifera, *Smith.* Europa (Dr. Masters !).
Orchis pyramidalis, *Linn.* Europa (Dr. D. Moore !).

The whole number of species known to produce double flowers now amounts to 290,—242 Exogens, and 48 Endogens, 171 Polypetalæ, 69 Monopetalæ, and 2 Apetalæ, distributed over 53 Natural Orders.—*B. Seemann.*

CORRESPONDENCE.

Orchis pyramidalis flore pleno.

Glasnevin, Sept. 2, 1864.

In the 'Journal of Botany' for last June you give a list of plants which are known to produce double flowers, including, among others, *Orchis Morio* on the high authority of Dr. Masters, who probably has studied the nature of the changes which take place in the parts of flowers becoming what is usually termed double, more scientifically than any other British botanist has done. On a plant so remarkable in this respect as an Orchid, Dr. Masters has, no doubt, published some observations which have escaped my notice. It would have added interest to the present communication, had I been able to compare his remarks (if any have been made) with my own.

Three years ago, Mr. Frederick J. Foot, who is attached to the Geological Survey of Ireland, as Assistant Geologist under Professor Jukes, and who is also a promising young botanist, sent to me specimens and roots of *Orchis pyramidalis flore pleno*, discovered by him and the late Dr. O'Brien, of Clare, growing on the limestone débris near Ballyvaughan, County of Clare, which circumstance Mr. Foot noticed two years ago in a paper he read before the Royal Irish Academy on the rarer plants of that county.

During the present season, one of the roots sent by that gentleman flowered at Glasnevin, and enabled me to observe the nature of some of the malformations which take place in the parts of the flower. The increase of sepals and lateral petals appears to be the result of collateral chorisis in the ordinary way. The labellum is rather thick and somewhat fleshy, much divided at the apex, and also occasionally at the margin. It is partly fused with the petaloid pistil, to which the pollen masses are still adhering with stalks, which are firm and tough. Their pouches are converted into petal-like substance, and filled up with same. There are also two more similar bodies partly formed, which are sessile, and placed nearer the apex of the pistil leaf, thus showing incipient development of duplication in those organs also.

It is further worthy of notice that a number of those double flowers were found near the same place, but not elsewhere, in the district, though the physical conditions of the neighbourhood are in every respect similar.—Yours, etc., D. Moore.

MEMORANDA.

GINSENG-ROOT (*Panax Ginseng*, Meyer.).—The Ginseng has been known from time immemorial as a drug, employed by the Chinese as a panacea for every kind of disease. The plant grows in the mountains surrounding the Ussuri, and spreads from there to other mountain-chains of northern China and Manchuria. The root, being much collected and high in price, is at present very rare everywhere, and has not been found by M. Maak (the explorer of the Ussuri district). In a northerly direction the plant has been met with as far as latitude 47° N., and it is besides cultivated by the Chinese on the Upper Ussuri, at Situchu, Lifulé, and Daubichá. The illustration given (plate 375) has been made from the most complete specimen existing in European herbaria, sent a long time ago by Kirilow, Collector for the Imperial Gardens at St. Petersburg, from Chinese Manchuria. The Chinese employ the root as well as the stem and leaves, preparing from it by boiling a thickened juice, which is used for wounds, pains of the stomach, etc. The extraordinary healing power of this drug as a vulnerary are confirmed by M. Maack. One of the Cossacks of his party cut off a finger with an axe; an ointment made of Ginseng being applied, the wound healed in a very short time. A careful comparison of the North American Ginseng with that of China shows that the former differs by its stem having from two to four verticillate leaves, the leaflets of which are broader towards the base than those of the Asiatic Ginseng. Other differences of the North American plant consist in usually deeper and less regular dentation of the leaflets, in the peduncle being about as long as the petioles or extending afterwards to about half the length of the leaflets, and in the styles being free almost to the very base. The Asiatic Ginseng, tied in bundles and prepared, is sold at a high price by the Chinese. It is not yet in our gardens. None of the seeds sent home have germinated, and there is difficulty in obtaining either seeds or living plants, as the Chinese, for fear of spoiling their trade, refuse to supply them. The cultivation of the root would probably succeed in Germany and even about St. Petersburg (E. Regel, Gartenflora, 1862, p. 314, t. 375). Regel believes this to be merely a variety of the North American *Panax quinquefolia*, which he names *Ginseng*, and of which he furnishes the following diagnosis: —Radice fusiformi; foliis caulinis quaternis digitato-partitis, foliolis 5 elliptico-oblongis, in petiolum attenuatis, acuminatis, duplicato-dentatis, glabris, supra in nervo medio venisque setis raris adspersis et in angulis dentium marginis setis solitariis ciliatis; pedunculo petiolos plus duplo superante, umbella simplici, multiradiata; baccis didymis, 2-spermis, stylo apice tantum bilobo coronatis.

NEW PUBLICATIONS.

Conspectus Criticus Diatomacearum Danicarum: Kritisk Oversigt over de Danske Diatomeer, af Dr. Ph. P. A. C. Heiberg. Copenhagen: W. Prior. London: Williams and Norgate, 1863.

The laborious and accurate works of O. F. Müller, some of them published more than a century ago, were the first extensive and important results of the application of the microscope to the study of minute animal and vegetable forms; and so much careful observation and accurate description do they contain, that they must still be consulted by every working naturalist, and will no doubt yet supply, as they have many times already supplied, a rich quarry for closet naturalists. He observed and figured at least eight species of Danish *Diatomaceæ*. Lyngbye, in his 'Tentamen Hydrophytologiæ Danicæ' (1818), described twenty-eight species, Hornemann (1837) and Oersted (1844) increased the number; but no detailed or complete account of the Danish species had been published until this volume of M. Heiberg appeared.

It was a fortunate circumstance for algologists that the first important local 'Flora Diatomacearum' was written by Smith, illustrated by West, and published by Smith and Beck. Each did his work as it had never been done before. The publishers produced a book that would grace a drawing-room table, the draughtsman surprised every one with the beauty and accuracy of his illustrations, and the descriptions of the author will be models for future workers. The influence of all this is evident in the work before us,—in descriptions, illustrations, and typography, it equals, if it does not surpass, the 'British Diatomaceæ.' But that the Danish language (unfortunately little known in Britain) is used throughout, it looks as if it were a supplement to the earlier work, and, indeed, British algologists will find that they must use it as such.

While the changes introduced by M. Heiberg are fair and just as regards some species, in respect to others we think he has overlooked important differences of specific value. Thus, in the genus *Epithemia*, while we are satisfied that the peculiarities given as characters for *E. Argus*, *E. alpestris*, and *E. longicornis* exist in nature and are recognizable, yet we doubt if they are of sufficient importance to make

the three forms more than marked varieties of one species; but we cannot understand how M. Heiberg has united *E. ventricosa* to *E. gibba*,—species that differ so strikingly in every particular. *Himantidium undulatum* is rightly referred to *H. pectinale;* and we prefer uniting the three *Cymbellæ* (*lanceolatum*, *Cistula*, and *cymbiforme*) with our author, to retaining them as distinct species, as Rabenhorst does in his recently published 'Flora Europæa Algarum.'

Pinnularia must, it seems, by common consent, be allowed to slip from among the genera of *Diatomaceæ*, notwithstanding Smith's attempt, by a careful amended definition, to establish it on a more satisfactory basis. It is indeed difficult in the smaller species to determine whether the valves are striate or costate, and consequently difficult or impossible to refer them certainly to *Navicula* or *Pinnularia;* but we confess that we give up the genus reluctantly, as we have found it very useful in the practical work of determining species, and we still hope that more perfect instruments, and better application of light, may enable us to consider Smith's characters as of specific value. While, therefore, we cannot object to M. Heiberg, in the present state of our knowledge, referring all the *Pinnulariæ* to *Navicula*, we most decidedly protest against his uniting in the same genus plants so diverse in their form and structure as the free and naked *Naviculæ* proper, the stipitate *Doryphora*, and the frond-invested genera *Berkeleya*, *Schizonema*, and *Colletonema*. It is true that if all our characteristics of *Diatomaceæ* are to be derived from the siliceous frustules, and if the peculiarities of the perfect plant are to be ignored, these genera cannot be distinguished; but surely we have in natural history got beyond the period of artificial classifications based on a single organ. Smith has erred less in dividing the whole class into two tribes characterized by the possession of naked or enveloped frustules, than M. Heiberg in uniting in the same genus plants belonging to both of these well-marked tribes. It would be absurd to urge in favour of such a classification that we cannot tell whether fossil species were stipitate, enclosed in a frond, or free. We canuot set aside the remarkable characters and important information derived from the living plants, and make a retrograde step, the only benefit of which would be to hide our ignorance. On the same ground we object to *Encyonema*, with its filamentous frond, beiug united to the stipitate *Cymbella*, and *Homœocladia* to *Nitzschia*.

As a set-off against this great reduction in genera in *Naviculeæ*, etc., we have an increase in *Melosireæ*. Both *Melosira* and *Orthosira* are retained as good genera. *M. nummuloides*, remarkable for its circular keel round each valve, is placed in the genus *Lysogonium*, and a new genus, *Paralia*, is established for *O. marina*, a species easily separated from its neighbours by its smooth median furrow and large cellules.

But the most interesting novelty in the volume is the description of the new forms united in the family *Hemiaulidæ*. We doubt whether there is sufficient foundation for separating the genera of this family from the *Biddulphieæ*. The frustules are united into a chain by the elongated projections at the angles, which are however always furnished with spines, and in this they differ from the *Biddulphieæ*. The characters of three out of the four genera are founded on the number of angles in the side view of the frustule, and the fourth has a cuneate front view. The species of this family must abound in our seas as they do in those of Denmark. Brightwell's *Triceratium obtusum*, from the Thames mud, is most probably Heiberg's *Trinacria excavata*.

We had noted some other points in M. Heiberg's valuable work, but our notice already occupies too much space. We must recommend the volume to our readers, satisfied that they will find it an important contribution to our knowledge of this minute and interesting class of *Algæ*.

The Ferns of Southern India. Being Descriptions and Plates of the Ferns of the Madras Presidency. By Captain R. H. Beddome, Official Conservator of Forests. Madras: Gantz, Brothers. London: Van Voorst. 4to. Parts I.–X.

This work is highly creditable to the author, who fills the office of Sub-Assistant Conservator of Forests at Ootacamund, and who seems to devote his leisure time to the study of Indian Ferns. It is issued in parts, each containing 10 pages of letterpress and 12 plates, in which the forms are represented in very characteristic outlines. Magnified sections of the fructification are also given. The whole has been got up and printed in India.

70 genera will be enumerated, 123 plates are now published in

the ten parts issued; about 6 more parts will complete the work. There is an analytical key of the Orders, tribes, and genera of the Ferns, and we have the following species described as new:—*Trichomanes Neilgherrense*, *Pteris Otaria*, *Campteria Anamallayensis*, *Ophioglossum brevipes*, *Lastrea ferruginea*, and *L. intermedia*. The work, when completed, will be a valuable one.

BOTANICAL NEWS.

Sir Robert Schomburgk, British Consul General for Siam, has arrived in England with considerable collections of the natural productions of that country.

On the 7th of September, died at Heersum, near Hildesheim, the Rev. A. Scheele, known by several systematic papers published in the 'Linnæa.' He leaves a considerable herbarium, consisting chiefly of German and Helvetic plants.

The next meeting of the British Association will be held at Birmingham, and that of the German Naturalists and Physicians at Hanover.

The first volume of Dr. Hooker's 'Manual Flora of New Zealand,' and the third of Mr. Syme's 'English Botany,' have just been published.

Mr. T. Caruel, of Florence, intends to proceed to Ceylon in January next, for the purpose of exploring it botanically, and another Italian, Mr. Biccari, favourably known as a cryptogamist, has determined upon visiting Borneo to investigate its flora.

Some time ago we mentioned that, at the instigation of Dr. Ferd. Mueller, of Melbourne, Mr. Travers, jun., of Christchurch, New Zealand, was about to explore botanically the Chatham Islands in the South Pacific. Mr. Travers has recently returned from this exploration, and as, besides *Myoxotidium nobile*, only a few of the plants gathered there by Dr. Dieffenbach are known from that group, Dr. Mueller has set about working up his collections into an independent publication. The Chatham Island species are almost all represented in New Zealand, but it will be important in a geographical point of view to record their existence in this isolated group of islands.

1.

2.

W. Fitch, del. et lith.

Vincent Brooks, Imp.

ON *POTAMOGETON NITENS, Weber*, AS AN IRISH PLANT.

By D. Moore, Ph.D., F.L.S., etc. etc.

(Plate XXIII.)

Those who have paid attention to aquatic plants know that many of them present different appearances at certain seasons of the year from that they have at others, whilst the various depth of water in which they happen to grow, is also calculated to alter their general appearance considerably. It must however be confessed that the species of *Potamogeton* admitted in the British Floras, though subject to similar alterations according to circumstances, have, for the most part, characters sufficiently well marked and constant to distinguish them. Ireland is already credited with two, namely, *P. sparganifolius*, Laest., and *P. longifolius*, Gay, not hitherto discovered in England or Scotland, whilst *P. nitens*, Weber, just discovered, makes a third, and forms another important link in the geographical distribution of plants which grow on the continent of Europe, having their only known British localities in the south-western counties of Ireland.

Potamogeton nitens has long been known to inhabit parts of France, Germany, and Scandinavia, as may be seen by reference to Reichenbach's Icones Fl. Germanicæ, vol. vii. t. 34; Koch, Synop. Fl. Germanicæ, ed. 1, p. 675; Grenier and Godron's Fl. France, vol. iii. p. 314, and Fries's Nov. Fl. Suecicæ, p. 34.

The Irish plant agrees closely with Reichenbach's figures and description, as well as with the descriptions given in the other Floras just quoted, with which it has been carefully compared by myself and those botanical friends who have assisted me to ascertain the species.

The following are the principal characters of the Irish plant:—Stems round, slender, much branched. Leaves all membranous, transparent, crowded on the stem; firm, shining, and recurved: the lower lanceolate, semiamplexicaul, pointed at both ends, about $1\frac{1}{2}$ inches long by $\frac{1}{2}$ inch in width, half folded, so as to appear channelled, and finely undulated at the margins. Upper leaves also submerged, broader and blunter at the points, narrowed at the base into a short petiole. Stipules persistent, membranous, about one-third the length of the leaf. Peduncle short and stout, about the length of the upper leaves, slightly thickened

upwards, with the flowers in a dense, short spike. Fruit on our specimens (scarcely ripe) small and semicircular in form, with a greenish rib-like keel, not prominent when fresh, but distinctly visible when half dried: the younger fruit ovate, with a slight prominence on the back.

P. nitens appears to hold a place between *P. heterophyllus*, Schreb., and *P. prælongus*, Wulffen. It may, however, be distinguished from the former by its broader lower leaves, semiamplexicaul at the base, channelled and reflexed, as also by its shorter peduncle, denser and shorter inflorescence. Besides in our plant no floating coriaceous leaves have been seen, either in July or September. *P. prælongus* has larger leaves, much broader at the base and hooded at the point, the upper not lengthening into a petiole at the base.

Our plant was discovered in considerable quantity growing in a large lake, a short distance from the sea, at Castle Gregory, near Brandon Mountain, county of Kerry. In the beginning of last July it was scarcely in flower, and in the third week in September more specimens were obtained from the same locality, with the fruit still immature, though falling off. It grew thinly scattered through the lake, having several stems, varying from 12 to 16 inches long, rising from the creeping root.

EXPLANATION OF PLATE XXIII., representing *Potamogeton nitens*, Weber, from specimens collected at Castle Gregory.—Fig. 1, an entire flower; 2, the ovaries, very young:—*all magnified.*

WELWITSCHII ITER ANGOLENSE.

[Under this title will be published, by various botanists of England, Germany, and Switzerland, a series of papers on the Vegetation of Western Tropical Africa, founded upon the valuable collections which that indefatigable explorer Dr. F. Welwitsch made in Angola, Benguela, and islands adjacent, when, aided by liberal grants from the Portuguese Government, he travelled through those countries. Few, or rather say no recent journeys have yielded a finer harvest of new genera and species than the explorations which Dr. Welwitsch, with so much credit to himself and the Government which so liberally supported him, conducted in these rich Portuguese possessions. They afford a

remarkable insight into the vegetation of western tropical Africa, and from a personal inspection of these materials, we can but endorse the flattering opinions which Professor Fenzl, of Vienna, M. Alph. de Candolle, of Geneva, and Dr. Hooker, of Kew, have expressed of Dr. Welwitsch's labours and their results.—EDITOR.]

I. EUPHORBIACEÆ NOVÆ A CL. DR. WELWITSCH IN AFRICA ÆQUINOCTIALI OCCIDENTALI LECTÆ, AUCTORE DR. J. MUELLER (MUELL. ARG.).

1. *Briedelia Angolensis*, Welw. in Sched.; foliis ovatis v. oblongo-ovatis breve acutatis basi subcordatis coriaceis subtus valde prominenter reticulato-venosis, costis secundariis utroque latere 12–15 infimis dense approximatis, ramulis florigeris microphyllinis, floribus dense glomeratis glabratis, petalis masc. obovato-spathulatis 3-lobis. Arbor minor. In Angola (Welw. It. Angol. n. 367).—Subsimilis *B. sclero-neuræ*, Müll. Arg. in Flore Ratisb. 1864, p. 489.

2. *Briedelia elegans;* foliis obovato-lanceolatis basi acutis membranaceo-coriaceis crenulatis subtus valde prominenter reticulato-venosis, costis secundariis utroque latere circ. 10–14, floribus in axillis foliorum glomeratis, calycis tubo puberulo laciniis glabris nitidulis, petalis masc. rhombeo-obovatis basi cuneatis superne angulosis. Frutex. In Benguela (Welw. It. Angol. n. 361).—Flores fœm. et fructus ignoti.

3. *Briedelia speciosa;* foliis breve petiolatis oblongato-ovatis breve cuspidato-acuminatis virentibus non prominenter reticulato-venosis, costis secundariis utroque latere 8–12, stipulis lineari-lanceolatis, floribus fasciculato-glomeratis fœm. sessilibus, petalis masc. exiguis 3-lobis fœm. e basi cuneata oblongo-obovatis subintegris parvis, urceolo perigyno elongato intus subsericeo, baccis oblongo-ellipsoideis.

— *α. trichoclada;* ramulis petiolis stipulis et calycibus breviter villoso-tomentosis, foliis glabris. Arbor 25-pedalis et altior. In Benguela (Welw. It. Angol. n. 371).—Altera varietas, *β. psiloclada*, ramulis cum floribus et foliis glabris, a cl. Mann (n. 1215) in monte Cameroon lecta est.

4. *Briedelia atro-viridis;* foliis lanceolato-ellipticis v. elliptico-obovatove-lanceolatis acute acuminatis subintegris membranaceis tenuiter reticulato-venosis obscuris, costulis transversis flexuosis debilibus, costis secundariis utroque latere circ. 15–20 tenuibus, floribus dense fasciculatis numerosis, calycis utriusque sexus laciniis triangulari-lanceolatis

longe acute acuminatis, petalis masc. e basi cuneata obovatis emarginatis fœm. ovato-lanceolatis, disco fœm. elongato glabro, stylis gracilibus, bacca fusiformi-ellipsoidea acuta. Arbor minor. In Angola (Welw. It. Angol. n. 370).

5. *Briedelia tenuifolia;* foliis angustius latiusve obovatis basi obtusis apice breve et obtuse acutatis submembranaceis undulato-crenulatis subtus prominenter sed tenuiter reticulato-venosis, costis secundariis utroque latere 8–16 angulo semirecto insidentibus, floribus in axillis foliorum glomeratis glabris, petalis masc. e basi unguiculari latioribus quam longis 3–5-lobis fœm. ovato-lanceolatis integris, disco perigyno glabro, baccis globosis. Arbor minor v. arbor 25-pedalis et altior. In Angola (Welw. It. Angol. n. 373, 374).—Affinis est *Briedeliæ montanæ*, Willd.

Cluytiandra, nov. gen.

Laciniæ calycis utriusque sexus quincunciales. (Petala suppressa.) Disci extrastaminalis lobi laciniis calycis oppositi. Stamina centralia, 5, calycis laciniis opposita; filamenta in columna centrali altius verticillatim inserta. Antheræ oscillantes (intus birimosæ). Rudimentum ovarii columnam centralem terminans, 3-partitum. Ovarium 3-loculare; loculi 2-ovulati. Capsulæ tricoccæ. Semina ecarunculata, exarillata.

Planta herbacea v. suffruticosa, perennis, subsimilis *Agyneiæ*. Flores masculi ut in *Cluytia*.

6. *Cluytiandra trichopoda;* foliis oblongato-ovatis acutiusculis basi obtusis integris membranaceis glaucescentibus, stipulis triangulari-ovatis acuminatis lacero-denticulatis, pedicellis omnibus capillaceis fructigeris longissimis, calycis laciniis orbiculari-ovatis membranaceis glabris, disco hypogyno urceolari integro, ovario lævi glabro, capsulis depresso-globosis leptodermeis pallidis, seminibus grosse verrucoso-asperis. ♃ v. suffrutex. In Angola, in montosis (Welw. It. Angol. n. 327).—Folia 12–18 mm. longa, 7–12 mm. lata. Pedicelli fructigeri $2\frac{1}{2}$ cm. æquantes.

7. *Thecacoris trichogyne;* foliis lanceolato-obovatis breve cuspidato-acuminatis basi subcuneato-angustatis integris utraque pagina prominenter reticulato-venosis rigide membranaceis, spicis masc. densifloris subamentiformibus, racemis fœm. elongatis laxifloris, calycibus pubescentibus, glandulis disci masculi crassis hirto-pubescentibus, urceolo hypogyno crenato intus pubescente, ovario sericeo-pubescente, stylis

bipartitis arcte recurvis, capsula depresso-didyma adpresse pubescente. Arbor minor. In Angola (Welw. It. Angol. n. 415).—Limbus foliorum 7–15 cm. longus, 3–5½ cm. latus.

8. *Phyllanthus (Menarda) Angolensis;* ramis florigeris breviusculis, foliis subsessilibus oblongo-obovatis acutiusculis basi obtusis, stipulis lanceolato-setaceis integris, floribus in axillis foliorum solitariis breve pedicellatis, calycis laciniis late ellipticis masc. hyalinis fœm. late albido-marginatis, disci masc. glandulis liberis orbicularibus fœm. in urceolum subintegrum connatis, connectivo infuscato, ovario lævi, stylis bifidis, seminibus minute verruculoso-puncticulatis. ⊙ In Angola (Welw. It. Angol. n. 332).—Folia 2½–4 mm. longa, duplo longiora quam lata. Affinis *P. tenello*, Roxb.

9. *Phyllanthus (Kirganelia) Loandensis*, Welw. in Sched.; ramulis florigeris subfasciculatis compressis tenuibus, foliis ovatis obovatisve utrinque obtusis v. apice acutiusculis firmis parvulis, stipulis lanceolatis subulato-acuminatis integris, floribus monoicis in axillis foliorum solitariis v. geminis breve pedicellatis, calycis fœm. laciniis orbiculari-ovatis præter nervum viridem v. fuscidulum albidis, disco hypogyno integro, glandulis masc. liberis orbicularibus parvis, filamentis inæquilongis fere usque ad basin liberis stricte erectis validis, antheris parvis demum inclinatis, ovario lævi, stylis bifidis parte integra in columnam connatis. Suffrutex v. frutex. In Angolæ agro Loandensi (Welw. It. Angol. n. 335).—Folia 8–4 mm. longa, 6–3 mm. lata.

Phyllanthi, sect. nov. PSEUDO-MENARDA.

Calyx masc. 5-partitus. Disci glandulæ 5. Stamina 5 (libera), antheræ verticaliter birimosæ. Styli 3, validiusculi, ex parte connati, parte libera subdilatati et bipartiti.

10. *Phyllanthus (Pseudo-Menarda) purpureus;* trunco ramisque purpureis, foliis subsessilibus elliptico-linearibus breve mucronulato-acuminatis basi acutis longo tractu æquilatis tenuissime reticulato-venosis, stipulis lanceolatis scariosis eroso-denticulatis, floribus monoicis in axillis foliorum fere omnium numerosis fasciculatis, glandulis masc. liberis reniformibus lævibus fœm. in urceolum 5-lobum connatis, ovario lævi, stigmatibus tumido-papillosis, capsulis subglobosis, tridymis, seminibus lævibus. Frutex. In Benguela (Welw. It. Angol. n. 329). —Folia 3–4½ cm. longa, 4–6 mm. lata.

Phyllanthi, sect. nov. ANISOLOBIUM.

Calyx 6-partitus; laciniæ 3 interiores reliquis multo majores, petaloideæ. Glandulæ crassæ. Stamina 3; filamenta in columnam connata; antheræ apice in conum communem abeuntes, pendulæ, longitrorsum birimosæ. Styli validiusculi, inferne connati, apice 2–4-lobi.

11. *Phyllanthus (Anisolobium) Welwitschianus;* foliis breve petiolatis ellipticis rotundato-obtusis mucronulatis basi obsolete cordatis, costis secundariis marginem versus subdendroideo-ramosis, stipulis infra basin semihastato-productis acuminatis scariosis laceris, floribus monoicis in axillis foliorum geminis v. ternis breve pedicellatis, calycis laciniis exterioribus late ovatis concavis rigidis interioribus subduplo majoribus obovatis omnibus margine ciliato-denticulatis, glandulis masc. liberis rugosis, urceolo fœm. crasso undulato, ovario lævi, columna stylari ovario sublongiore, capsulis valide nervosis, seminibus minute glanduloso-puncticulatis. Suffrutex. In Angola (Welw. It. Angol. n. 330, 331).

12. *Phyllanthus (Paraphyllanthus) virgulatus;* caulibus virgulato-ramosissimis cum ramulis teretibus rectis, foliis lineari-lanceolatis subulato-acuminatis basi acutis pallide subcalloso-marginatis læviter curvis densiusculis, stipulis e basi lanceolata setaceis patulis, floribus masc. geminis v. ternis, calyce evoluto turbinato basi acuto, laciniis masc. obovatis, disci masc. glandulis liberis ellipticis convexis, columna staminali integra, antheris tumidis inferne inter se subconnatis, capsulis depresso-globosis, seminibus dorso secus lineas longitrorsas transversim striolatis. Suffrutex. In Angola (Welw. It. Angol. n. 328).—Affinis *P. genistoidi*, Sond.

13. *Phyllanthus (Paraphyllanthus) prostratus*, Welw. in Sched.; caulibus prostratis ramosissimis, ramulis compressis dense foliosis, foliis subsessilibus lanceolato-ellipticis mucronato-acuminatis basi acutis glaucis, floribus dioicis in axillis foliorum solitariis, pedicellis calyce brevioribus, laciniis calycis supra basin subcontracti subturbinati oblongo-obovatis acutis fructigeri laciniis lanceolato-obovatis albido-marginatis, disci masc. glandulis liberis orbicularibus, fœm. in urceolum minutum connatis, columna staminali integra inferne ampliata apice angustata, antheris liberis, ovario lævi, seminibus dorso minute longitrorsum costulatis et transversim striolatis. Suffrutex. In Benguela (Welw. It. Angol. n. 333).—Folia 5–6 mm. longa, $2\frac{1}{2}$–3 mm. lata.

14. *Phyllanthus (Paraphyllanthus) microdendron*, Welw. in Sched.;

caule dendroideo-ramoso, ramis compressis, ramulis patulis dense foliosis, foliis oblongo-ovatis breve acuminatis basi obtusis firmis, stipulis exiguis lanceolatis setaceo-acuminatis, floribus monoicis fœm. in axillis foliorum solitariis masc. geminis v. solitariis inferioribus, pedicellis fructigeris calyce majusculo brevioribus, laciniis calycis late ellipticis anguste albido-marginatis, glandulis masc. liberis orbicularibus fœm. in urceolum exiguum connatis, columna staminali elongata integra, connectivis inferne inter se connatis, ovario lævi, stylis brevibus, seminibus dorso longitrorsum costulatis. Suffrutex. In Benguela (Welw. It. Angol. n. 334).

15. *Phyllanthus (Paraphyllanthus) odontadenius;* foliis ellipticis obtuse acutatis membranaceis, stipulis setaceis, floribus monoicis in axillis foliorum solitariis masc. inferioribus, pedicellis fœm. calyce majusculo paulo brevioribus, calycis fœm. laciniis lanceolato-obovatis acutis præter nervum viridem albidis flaccidis, calyce masculo exiguo, disci masc. glandulis liberis stellato-papillosis, disco hypogyno urceolari eleganter multidentato-lobato, columna staminali integra, ovario lævi, seminibus dorso minute longitrorsum costulatis cæterum lævibus. ⊙ In Angolæ regione montana (Welw. It. Angol. n. 317).—Similis *Phyllantho Benguelensi.*

16. *Phyllanthus (Paraphyllanthus) Benguelensis;* foliis oblongo-ellipticis inæquilateralibus venulosis, floribus monoicis in axillis foliorum sitis fœm. solitariis masculis geminis inferioribus, pedicellis masc. capillaceis fœm. rigidis calycem fructigerum superantibus, calycis fœm. laciniis obovatis acutis membranaceis, glandulis masc. liberis depressis concavis margine subcrenatis, urceolo fœm. crassiusculo integro, columna staminali 3-fida, ovario lævi, stylis bifidis brevibus tenuibus, seminibus verruculoso-puncticulatis. ⊙ In Benguela (Welw. It. Angol. n. 315).—Similis *P. lathyroidi,* Kunth.

17. *Phyllanthus (Euphyllanthus) Niruroides;* ramulis filiformibus, foliis oblongato-ellipticis utrinque obtusis tenellis, stipulis lanceolatis subulato-acuminatis, floribus monoicis in axillis foliorum solitariis, pedicellis calycem æquantibus, calycis laciniis orbiculari-ovatis obtusis præter fasciam dorsalem viridem expallentibus, disci masc. glandulis liberis eleganter stellato-4–6-tuberculatis, disco hypogyno-urceolari integro, columna staminali integra, ovario dense papilloso-aspero, capsula parva dense granulato-verrucosa, seminibus dorso lævissime longitrorsum paucicostulatis. ⊙ In Sierra Leone (Welw. It. Angol. n. 316).—Similis *Phyllantho Niruri,* L.

18. *Phyllanthus (Euphyllanthus) microphyllinus;* ramulis patulis dense foliosis, foliis oblongato-ovatis v. ellipticis utrinque obtusis, floribus monoicis fœm. in axillis foliorum solitariis superioribus masc. solitariis v. geminis breve pedicellatis, calycis fœm. laciniis late ellipticis albido-marginatis demum subampliatis, disci masc. glandulis liberis sublævibus fœm. in urceolum exiguum connatis, columna staminali integra, ovario lævi, stylis bifidis brevibus, capsulis depresso-globosis læviuscule 3-sulcatis, seminibus dorso secus lineas longitrorsas transversim striolatis. ☉ In Angolæ regione montana (Welw. It. Angol. n. 312).—Similis *P. diffuso*, Kl., et *P. microphyllo*, Kth.

19. *Phyllanthus (Euphyllanthus) arvensis;* ramulis florigeris patulis breviusculis, foliis oblongo-ellipticis utrinque rotundato-obtusis summis apice acutiusculis, stipulis exiguis setaceis fuscis margine minute denticulatis, floribus dioicis masc. in axillis foliorum geminis v. solitariis parvis breve capillaceo-pedicellatis, calycis laciniis obovatis, disci masc. glandulis ellipticis sublævibus, columna staminali apice breviter triloba. ♃ In Benguelæ regione montana (Welw. It. Angol. n. 313).—Simillimus *P. microphyllino.*

20. *Uapaca Benguelensis;* foliis oblongo-obovatis basi longius breviusve cuneato-angustatis varie petiolatis v. sessilibus apice obtusis tenuiuscule coriaceis, inflorescentiis axillaribus pedunculatis globosis, involucri foliis membranaceis pubescentibus, calyce fœm. regulariter masc. subirregulariter 5-partito, laciniis superne pubescentibus, filamentis et antheris glabris, antheris leptodermeis apice breviuscule bilobis, rudimento ovarii superne dilatato hispido, ovario ellipsoideo ferrugineo-tomentoso, stylis ter–quinquies dichotome bipartitis. Arbor minor. In Benguelæ parte montana (Welw. It. Angol. n. 453).—Folia 14–20 cm. longa, 7–11 cm. lata.

21. *Manniophyton fulvum;* foliorum limbo orbiculari-ovato breve cuspidato-acuminato basi cordato quintuplinervio elobato v. brevius lobato-tricuspidato, petiolis inferne intus conico 2–4-glandulosis, indumento partim fulvo, bracteis sublinearibus, petalis fœm. ellipticis dorso puberulis masculis longiuscule in tubum connatis, disco masc. urceolari, staminibus circ. 18, ovario fulvo-strigoso globoso-trigono. Frutex. In Angolæ districto Golungo-Alto (Welw. It. Angol. n. 349). —Folia 10–20 cm. longa et totidem lata.—*Anisochlamys polymorpha*, Welw. mss.

22. *Lepidoturus occidentalis;* petiolis limbum sæpius æquantibus,

limbo ovato longe et obtuse cuspidato-acuminato basi cordato lucidulo rigidule membranaceo, stipulis parvis setaceis, spicis masc. sessilibus imbricato-bracteatis fœm. paucifloris, bracteis masc. scariosis brunneis orbiculari-rhombeis subintegris, ovario lævi, capsula globosa tridyma lævi, seminibus lævibus. Frutex. In Angolæ regione sylvatico-montana (Welw. It. Angol. n. 407, 408).—Similis *L. alnifolio*, Baill., sed ovario, capsula et seminibus diversus.

23. *Tragia (Tagira) Angolensis;* foliis breviuscule petiolatis lanceolatis v. lineari-lanceolatis sensim acuminatis basi subcordatis serrato-dentatis, bracteis anguste lineari-lanceolatis, calyce fœm. sessili 6-partito sub fructu haud indurato, laciniis ambitu oblongo-obovatis, parte rhacheali lanceolato-obovatis breviuscule 13-lacinulatis lacinulis lineari-ellipticis obtusis, ovario hispido-sericeo, stylis validis. ♃ In Angolæ et Benguelæ regione montana (Welw. It. Angol. n. 425, 426).—Similis *F. angustifoliæ*, Benth.

24. *Claoxylon (Athroandra) Welwitschianum;* petiolis limbo circ. 7-plo brevioribus, limbo elliptico-lanceolato cuspidato-acuminato basi acuto repando-dentato membranaceo, racemis utriusque sexus longe pedunculatis subfasciculatim florigeris, pedicellis fœm. filiformibus masc. capillaceis elongatis, calyce masc. depresso-sphærico obtuso flaccido, disco hypogyno bilobo, glandulis juxtastaminalibus exiguis viridibus longepilosis, staminibus circ. 30, stigmatibus in columnam cylindrico-obovoideam subbilobulatam connatis lævibus, seminibus grosse scrobiculato-asperis. Frutex. In Angolæ sylvis densis (Welw. It. Angol. n. 397).—Proximum est *C. columnari*, Müll. Arg. in Flora Ratisb. 1864, p. 437.

25. *Claoxylon (Athroandra) Angolense;* foliis lanceolato-ellipticis acute cuspidato-acuminatis basi acutis denticulatis membranaceis ima basi minute biglandulosis, racemis fœm. longiuscule pedunculatis circ. 4-floris, disco hypogyno urceolari nano subintegro, ovario glabro, stylis semiliberis lævibus. Frutex. In dumetis petrosis Angolæ (Welw. It. Angol. n. 399).

26. *Claoxylon (Athroandra) pauciflorum;* petiolis limbo 7–10-plo brevioribus, limbo lanceolato-ovato acuminato basi acuto denticulato membranaceo, racemis utriusque sexus foliis multoties brevioribus breve pedunculatis depauperatis 2–5-floris, calyce masc. subgloboso acutiusculo basi læviter umbilicato, disco hypogyno profunde trilobo tenui, staminibus circ. 24–30, glandulis juxtastaminalibus viridibus pilos inæquales

2–4 gerentibus, ovario glabro, stylis liberis reflexo-patulis crasse papillosis, seminibus sublævibus. Frutex. In Angola (Welw. It. Angol. n. 400).—Proximum *Claoxylo Barteri*, Hook. f. in Linn. Soc. Journ. vol. vi. p. 21.

27. *Claoxylon (Athroandra) trichogyne;* foliis breviuscule petiolatis oblongo-ovatis cuspidato-acuminatis basi acutis margine repando-dentatis membranaceis subtus molliter pubescentibus, racemis fœm. gracillimis depauperatis 2–3-floris, rhachi filiformi, bracteis exiguis, floribus distantibus, disco hypogyno bilobo, ovario dense villoso, stylis liberis divergenti-recurvis valide papillosis, seminibus scrobiculatis. Frutex. In Angolæ regione montano-sylvatica (Welw. It. Angol. n. 396).—Foliorum limbus 4–7 cm. longus, 2–3 cm. latus.

28. *Claoxylon (Athroandra) triste;* foliis breviuscule petiolatis lanceolatis sensim longe acuminatis basi acutis parce dentatis molliter pubescentibus rigidule membranaceis, floribus fœm. solitariis breve subcapillaceo-pedicellatis, calycis fœm. laciniis lanceolato-ovatis, glandulis hypogynis compresso-cylindricis calycem paulo superantibus apice truncatis, ovario villosulo, stylis liberis arcte recurvis grosse papillosis, seminibus in arillo coccineo læviuscule scrobiculatis. Frutex. In Benguela (Welw. It. Angol. n. 390, 391).—Limbus foliorum 2–2½ cm. longus, 4–8 mm. latus.

29. *Acalypha (Euacalypha) dumetorum;* foliis breve petiolatis lanceolatis tripli-quintuplinerviis crenulato-dentatis, stipulis linearibus, spicis fœm. ovoideis densifloris sessilibus, bracteis fœm. 1-floris latissime ovatis circ. usque ad medium inæqualiter circ. 17-laciniatis longitrorsum plicatis, laciniis lineari-lanceolatis subulato-acuminatis apice subrecurvis, ovario sericeo-pubescente, stylis pectinatim breviuscule multilacinulatis, seminibus lævibus. Frutex v. suffrutex. In Benguelæ et Angolæ regione montana (Welw. It. Angol. n. 430, 431, 432).

30. *Acalypha (Euacalypha) Welwitschiana;* petiolis limbum æquantibus, limbo oblongo-ovato acuminato basi cuneato-contracta obtuso quintuplinervio obtuse crenato-dentato membranaceo, spicis fructigeris amplis cylindrico-ellipsoideis obtusis, bracteis fœm. 1-floris obovatis cyathiformi-concavis pro ⅔ longitudinis 15–25-fidis, laciniis inæqualibus e basi lanceolata setaceo-acuminatis, ovario lævi glabro, stylis gracilibus breviter 15–21-lacinulatis, seminibus lævibus. Frutex. In Angola ad oras sylvarum (Welw. It. Angol. n. 433).—Affinis et similis *A. Mannianæ*, Müll. Arg.

31. *Acalypha (Euacalypha) Angolensis;* petiolis limbum æquantibus, limbo oblongo-ovato subacuto quintuplinervio obtuse crenato-dentato, stipulis lineari-subulatis, floribus dioicis, spicis fœm. subsessilibus axillaribus terminali minoribus oblongo-ellipsoideis, stylis longe exsertis rubro-comatis, bracteis fœm. 1-floris pro $\frac{2}{5}$ longitudinis 15–17-laciniatis, laciniis inæqualibus e basi lineari-lanceolata subulato-acuminatis, ovario sericeo-hispido, stylis valde elongatis longiuscule multilacinulatis. Frutex. In Angola (Welw. It. Angol. n. 434).

32. *Acalypha (Euacalypha) polymorpha;* foliis subsessilibus penninerviis dentatis rigidis, stipulis setaceis, spicis fœm. sessilibus breviuscule cylindricis densifloris masc. pedunculatis patulis majusculis, bractea fœm. 1-flora circ. usque ad medium multifida, laciniis e basi triangulari-lanceolata setaceo-acuminatis inæqualibus capsulam longe superantibus, ovario hispidulo lævi, stylis rigidis tota longitudine breviuscule divergenter lacinuligeris, seminibus lævibus.

— α. *elliptica;* foliis oblongo-ellipticis obtusis v. obtuse acuminatis parce pubescentibus. ♃ In Benguelæ regione montana (Welw. It. Angol. n. 429).—Caules semipedales. Folia 3–6 cm. longa, 2–3 cm. lata.

— β. *sericea;* foliis lanceolato-ovatis acute sed breve acuminatis in costis sericeo-pubescentibus. ♃ Cum var. α (Welw. It. Angol. n. 421).

— γ. *oblongifolia;* foliis lanceolato-ellipticis v. sublanceolatis breve acuminatis pubescentibus. ♃ Cum var. α (Welw. It. Angol. n. 428).

— δ. *angustifolia;* foliis lineari-lanceolatis acuminatis pubescentibus. ♃ Cum varr. præcedentibus (Welw. It. Angol. n. 422).

— ε. *depauperata;* foliis lineari-lanceolatis acuminatis, spicis masc. rarescentibus fœm. præter terminalem interdum deficientem ad florem sæpius unicum reductis. ♃ Cum var. præcedentibus (Welw. It. Angol. n. 424).

33. *Acalypha (Euacalypha) Benguelensis;* petiolis limbo circ. 5-plo brevioribus, limbo oblongo-ovato acuminato denticulato quintuplinervio, spicis fœm. densifloris ovoideo-cylindricis subsessilibus, bracteis fœm. 1-floris cyathiformibus truncatis circ. sexta parte longitudinis in dentes 9–11 late ovatos obtusos divisis fructigeris capsula breviori-bus, ovario lævi hirsuto, stylis rigidulis patule multilacinulatis, seminibus lævibus.

— α. *trichogyne;* ovario pilis albidis hispido, stylis pallide purpu-

reis roseis v. albidis. ♃ In Benguela (Welw. It. Angol. n. 435). Herba 1–1½-pedalis, satis similis *A. villicauli*, Hochst.

— β. *adenogyne*; ovario pilis breviusculis apice glanduloso-capitatis superne dense v. densiuscule obsitis, stylis atro-purpureis. ♃ In Angola (Welw. It. Angol. n. 436).

34. *Acalypha (Euacalypha) segetalis*; foliis longe petiolatis ovatis acutis quintuplinerviis dentatis, stipulis exiguis setaceis, spicis androgynis in apice ramulorum et in axilla foliorum sitis, bracteis fœm. in quaque spica 2–5 laxis 3-floris majusculis late triangulari-ovatis acutis breve circ. 19–21-dentatis, dentibus late ovatis obtusis, ovario hispido, stylis tenuibus subpalmato-3–4-laciniigeris, laciniis tenuibus, seminibus lævibus. ☉ In Angola (Welw. It. Angol. n. 389, 416, 440). —Similis et affinis *A. parvulæ*, Hook. f., et *A. reptanti*, Sw.

Neoboutonia, nov. gen.

Calyx masc. valvatim bipartitus, fœm. quincuncialiter 5-partitus. Petala 0. Discus utriusque sexus evolutus. Stamina centralia, in receptaculo convexo piloso sita; filamenta libera. Antheræ basifixæ, intus longitrorsum birimosæ; loculi connati. Rudimentum ovarii 0. Ovarium 3-loculare, loculi 1-ovulati, unus bracteam spectans, duo postici. Styli 3, bipartiti.—Paniculæ masculæ similes iis *Alchornearum*, characteres fere *Malloti*.

35. *Neoboutonia Africana*; petiolis limbum fere æquantibus, limbo orbiculari-ovato breve acutato basi late cordato subseptuplinervio transverse costulato margine obiter lobato ceterum integro, paniculis masc. amplis floribundis subvirgato-ramosis, laciniis calycis fœm. oblongato-ovatis 5-costatis, staminibus 18, antheris apice ceraceo-appendiculatis, ovario sericeo-tomentello, carpidiis dorso carinatis, stylis rigidis. Arbor minor. In sylvis primitivis Angolæ (Welw. It. Angol. n. 359).—Limbus foliorum 10–30 cm. longus et totidem latus.

36. *Alchornea (Heteralchornea) floribunda*, Muell. Arg. in Flora Ratisb. 1864, p. 435.

— β. *glabrata*; ramis gracilioribus, paniculis masc. minus amplis, floribus glabris purpureis. Frutex. In Angola (Welw. It. Angol. n. 352).

37. *Mappa heterophylla*; petiolis limbum fere æquantibus, limbo ultra medium 3–7-lobo v. elobato basi cordato v. obtuso coriaceo-membranaceo subtus ferrugineo et glandulis atro-fuscis adsperso, lobis lan-

ceolato-ellipticis cuspidato-acuminatis, stipulis magnis lanceolatis, paniculis masc. racemiformi-contractis, bracteis masc. exterioribus triangulari-ovatis acuminatis utroque latere fimbriato circ. 7-lacinulatis, staminibus 1–2. Frutex. In Sierra Leone prope Freetown (Welw. It. Angol. n. 464).

38. *Mappa Angolensis;* foliis longe petiolatis late orbiculari-ovatis 3-lobis v. elobatis basi epeltatis subcordatis subtus sparse aureo-glandulosis, bracteis magnis lanceolatis acuminatis masc. multidentatis, calyce fœm. urceolari ovarium cerino-glandulosum arcte cingente, antheris 2–3, ovario apice tomentoso, stylis tenuibus valide papillosis, seminibus laxe elevato-reticulatis. Frutex. In Angolæ regione montana (Welw. It. Angol. n. 449, 450).

39. *Macaranga monandra;* petiolis limbum æquantibus, limbo ovato acuminato basi obtuso grosse repando-dentato basi supra grosse maculato-biglanduloso epeltato subtus glandulis aureis adsperso, stipulis lanceolatis, paniculis axillaribus pedunculatis fœm. pyramidatis v. racemiformi-contractis, bracteis exterioribus e basi acuta rhombeo-ovatis superne lobato-paucidentatis, calyce fœm. urceolari margine 3–4-lobo, fœm. tomentoso, stamine unico, ovario ovoideo obliquo dense ceraceo-glanduloso, stigmate sessili subhemisphærico quam ovarium pluries breviore. Arbor minor. In Angola (Welw. It. Angol. n. 446).—Limbus foliorum 8–12 cm. longus, 5–9 cm. latus.

40. *Ricinus communis, ζ. Benguelensis;* toto e viridi glauco-pruinoso, capsulis laxius et breviuscule echinato-aculeatis. In Benguela (Welw. It. Angol. n. 307). Capsulæ 16 cm. longæ, semina 11 mm. longa.

41. *Cluytia Benguelensis;* foliis ovato- v. elliptico-lanceolatis acuminatis basi acutis membranaceis, floribus 1–5-nis, pedicellis masc. calycem demum sesquiæquantibus pubescentibus, calycis masc. pubescentis laciniis elliptico-obovatis intus squama elongata adnata pennatim glanduloso-3–5-loba auctis basi 3-glandulosis, petalis masc. basi longe unguiculato-angustatis intus valde carinato-incrassatis basi biglandulosis sc. fundo floris 30-glanduloso. ♃ InBenguela (Welw. It. Angol. n. 338).

42. *Excæcaria (Excæcariopsis) oblongifolia;* foliis valde oblongato-ellipticis breve acuminatis basi obtusis margine subspinuloso-denticulatis utraque pagina prominenter reticulato-venosis, racemis terminalibus, bracteis late triangularibus subulato-acuminatis eglandulosis

masc. 5–1-floris, calycis fœm. laciniis triangularibus acutissimis basi utrinque nunc glandula nunc lacinula sublibera auctis intus eglandulosis, carpidiis 3 dorso bialato-appendiculatis, capsularum coccis dorso demum parvule biappendiculatis, seminibus lævibus. Suffrutex. In Angola (Welw. It. Angol. n. 375).—Foliorum limbus 5–8 cm. longus, 17–20 mm. latus.

43. *Croton (Eluteria) Mubango;* petiolis limbo subduplo brevioribus, limbo ovato basi læviter cordato penninervio subtus lepidinibus argillaceo-argenteis vestito, stipulis setaceis elongatis, racemis validis floribundis macranthis, pedicellis crassis angulosis calycem bis æquantibus, alabastris masc. globosis fœm. subacute ovoideis omnibus ferrugineo-lepidotis, petalis dorso argenteo-lepidotis fœm. linearibus calycem æquantibus, staminibus circ. 35, ovario dense lepidoto, stylis depressis ter bifidis, capsulis maximis subglobosis ferrugineis, seminibus lævibus. Arbor minor. In Angola, ubi *Mubango* nuncupatur (Welw. It. Angol. n. 348).—Semina matura 17 mm. longa, 14 mm. lata. Folia 6–10 cm. longa.

44. *Croton (Eluteria) Welwitschianus*; petiolis limbo $2\frac{1}{2}$–3-plo brevioribus, limbo lanceolato-ovato acuto basi læviter cordato et stipitato-biglanduloso penninervio integro subtus lepidinibus argillaceo-argenteis hinc inde fuscis fere dimidia longitudine radiorum incisis vestito, stipulis rudimentariis, bracteis masc. plurifloris lineari-lanceolatis, floribus globosis ferrugineo-lepidotis, petalis fœm. elliptico sublinearibus, staminibus 20, ovario dense lepidoto-squamoso, stylis brevibus bis v. ter bifidis. Arbor minor. In Benguela (Welw. It. Angol. n. 341).—Species pulchra, nobilis.

45. *Croton (Eluteria) Draconopsis;* petiolis limbo paulo brevioribus, limbo late triangulari-ovato cuspidato-acuminato basi minute patellari-biglanduloso cordato quintuplinervio irregulariter serrato-dentato membranaceo, pilis flaccide lepidoto-stellatis, stipulis subulatis, racemis floribundis, bracteis inferioribus bisexualibus omnibus plurifloris, calycis fœm. laciniis anguste lanceolatis exterioribus calycis masc. reliquis angustioribus, staminibus circ. 15, ovario biloculari dense vestito, stylis latiusculis bifidis. Arbor 25-pedalis et altior, et arbor minor. In Angolæ sylvis primitivis editioribus (Welw. It. Angol. n. 343, 345, 347, 445).—Similis est *Croton Draco*, Schlecht.

46. *Croton (Cyclostigma) pyrifolius;* petiolis limbum subæquantibus, limbo ovato breve cuspidato-acuminato crenato-dentato penniner-

vio olivaceo-viridi, stipulis subulatis elongatis, racemo longissimo valde floribundo, bracteis infimis ex parte bisexualibus superioribus masculis fasciculato-plurifloris, laciniis calycis fœm. lineari-lanceolatis, petalis fœm. subulatis, staminibus 11, disco hypogyno 5-lobo, ovario pilis lepidoto-stellatis adpressis fulvis adsperso, stylis rigidulis apice bilobis. Arbor 25-pedalis et altior. In Angolæ sylvis primitivis (Welw. It. Angol. n. 344).—Nulli nisi *Crotoni Guyanensi*, Aubl. subsimilis.

47. *Croton (Cyclostigma) oxypetalus ;* petiolis limbo subtriplo brevioribus, limbo lanceolato-ovato v. ovato-lanceolato acuminato basi breve stipitato-biglanduloso breve tripli-quintuplinervio denticulato subtus flavicante, stipulis obsoletis, racemis elongatis floribundis, bracteis inferioribus pro parte bisexualibus, pedicellis fœm. subnullis masc. gracilibus subternis, calycis fœm. laciniis linearibus, petalis masc. lanceolatis acute acuminatis calycem duplo superantibus superne glabris, disci utriusque sexus glandulis triangularibus acute acuminatis, staminibus 15, ovario subcompresso 3–4-loculari acuminato ferrugineo-tomentoso, stylis elongatis semel profunde bipartitis. Arbor 25-pedalis et altior, et arbor minor. In Angola (Welw. It. Angol. n. 346).—Limbus foliorum 8–10 cm. longus, $2\frac{1}{2}$–4 cm. latus.

48. *Croton (Eutropia) Angolensis ;* petiolis limbo subduplo brevioribus, limbo oblongo-subrhomboideo-ovato acuminato basi subangustata læviter cordato et stipitato-biglanduloso breve quintuplinervio membranaceo, racemis brevibus laxifloris, bracteis exiguis lineari-lanceolatis unifloris, pedicellis masc. calycem demum sesquiæquantibus, calycis masc. laciniis late ovatis, staminibus 15, filamentis glabris. Frutex. In Angola (Welw. It. Angol. n. 392).—Similis *C. rivulari*, E. Mey.

49. *Cleistanthus Angolensis*, Welw., Sched.; foliis breve petiolatis elliptico- v. obovato-lanceolatis cuspidato-acuminatis basi acutis integris coriaceo-membranaceis reticulato-venosis, costis secundariis utroque latere 5–6 tenuibus, stipulis et bracteis dorso haud glanduloso-fuscescentibus, bracteis mox deciduis, laciniis calycis utriusque sexus anguste lanceolatis, petalis utriusque sexus lineari-lanceolatis v. lineari-spathulatis integris fœm. calyce duplo masc. 4-plo brevioribus, rudimento ovarii subsericeo-pubescente, ovario cum stylis ferrugineo-sericeo, capsulis subglobosis. Arbor minor. In Angola (Welw. It. Angol. n. 353).—Limbus foliorum 6–12 cm. longus, $2\frac{1}{2}$–$4\frac{1}{2}$ cm. latus.

ON *SAGINA NIVALIS*, *Lindbl.*

By C. C. Babington, M.A., F.R.S., F.L.S.

In my Manual (ed. 3, p. 48) I mentioned a specimen found on Glass Mhiel, a mountain in Forfarshire, as perhaps the *Sagina nivalis*. That plant I now believe to be *S. saxatilis*.

Dr. Walker-Arnott introduced into the 'British Flora' (ed. 7, p. 64; the second edition edited by him), under *S. subulata*, the words, "β. almost quite glabrous. *S. nivalis*, Fries;" and as its locality, "Isle of Skye and Clova Mountains." The same words will be found in the eighth edition of the Flora. Dr. Walker-Arnott has informed the editor that he is now unable to find the specimens (if he has them) or the authorities upon which that statement rests, and we must therefore remain in doubt for a time concerning the correctness of his determination of the identity of the plants with that of Fries. I fully agree with the remark (Journ. Bot. I. 355) that an "almost quite glabrous" state of *S. subulata* is not the *S. nivalis*.

The first announcement of the true *S. nivalis* as a native of Scotland appeared in this Journal (I. 355) from the pen of Mr. H. C. Watson; but it was apparently first detected by Mr. Boswell Syme, amongst specimens gathered on Ben Lawers by Professor Balfour, on August 25, 1847. They were intermixed with examples of *Alsine rubella*. Recently Dr. Balfour has been so kind as to give me good specimens of it gathered on that occasion, and also others obtained by him on the same mountain towards the end of August, 1864. He likewise found it on a mountain by Glen Dochart, called "Stobinnain," in the same month.

The true *S. nivalis*, Lindbl., is little known to botanists. It has been obtained from very distant parts of the northern regions. Blytt found it on the Dorvefjeld, in Norway; Vahl figures it from specimens gathered between Godshaab and Upernavik, in Greenland; and Malmgren records it in 'Ofversigt af Spetsbergens Fanerogam-Flora' (also Seem. Journ. of Bot. ii. 141) as a native of Spitzbergen. It also appears, by a reference in Hooker's 'Distribution of Arctic Plants' (Linn. Trans. xxiii. 287 and 321), to have been found in the Asiatic part of the country of the Samojedes. In Norway it seems to grow only at a great elevation on the mountains, in Greenland and Siberia it appears to descend

to near the level of the sea, and such is probably the case in Spitzbergen and Samojed-land. Our station on Ben Lawers must be very elevated, for it there, as Dr. Balfour believes, accompanies *Alsine rubella*.

Fries remarks that *S. saxatilis* has a barren central stem [rosette], which throws out from its base lateral, procumbent, rooting shoots, each ending in a long peduncle; but that the stems of *S. nivalis* form a cæspitose mass, are erect and short, and bear short peduncles. He adds that the petals of *S. saxatilis* are slightly emarginate, but that those of *S. nivalis* are entire. These remarks agree admirably with my specimens received from Dr. Balfour, but by some oversight Mr. Sowerby has figured what he calls *S. nivalis* (Syme's E. B. t. 250 *bis*) with a very decided rosette, and Mr. Syme says of the primary or central stem that it is "reduced to a barren rosette of leaves, never bearing any flowers." It is clear that if the specimen has this structure, it cannot be the *S. nivalis* as described by Fries. I have before me specimens of the true plant, gathered by the late Professor Blytt in Norway and issued by Fries, which agree well with those gathered on Ben Lawers, except that on one of them there is an appearance of a rosette; but careful examination convinces me that there really is none, and the other specimen is conclusive against its existence. My examples from Ben Lawers certainly have no rosette. It should be recollected that much care is requisite, for one of the forms of *S. apetala* seems to have a rosette until after many of the branches have flowered; but in *S. apetala* this false rosette invariably grows into a flowering-stem as the age of the plant advances, and ultimately this central stem does not in any respect differ from the lateral stems. It is possible that *S. nivalis* may pass through similar stages in its growth. How different this structure is from that of the true rosette-bearing plants is seen by an examination of *S. procumbens*, in which the rosette never increases in length after it is once formed, but is always manifest at the top of the root-stock. As soon as the rosette is well developed it ceases to grow until the spring of the following year, then its terminal bud advances slightly so as to produce a new central rosette of leaves with axillary buds to replace that of the preceding year, the leaves of which latter, together with its branches, have faded and lost all their vitality. As Mr. Syme justly remarks, *S. nivalis* very closely resembles some states of *S. maritima*; but the former plant is perennial, has tapering acute leaves,

rather large and conspicuous petals, and is pretty constantly, if not always pentamerous. The leaves bear very short points, like, but smaller than, those of *S. saxatilis*. I find no trace of gland-tipped hairs on the peduncle or calyx; but Vahl represents a few on the latter organ, although he describes them as subglabrous. Some states of *S. procumbens* much resemble this plant, but are not likely to be confounded with it by a careful observer. Our plant may be characterized as follows:—

S. nivalis, Lindbl.; stem and branches ascending, cæspitose; leaves subulate, mucronate, glabrous; peduncles short, straight; flowers pentamerous; sepals very blunt, adpressed to ripe capsule; petals rather exceeding the calyx, but falling short of the capsule, entire.

Spergula nivalis, *Lindbl. in Phys. Sallsk. Tidskr.* 1838, p. 128 (1838).

Sagina nivalis, *Lindbl. Bot. Not.* 1845, 66 (1845).—*Fries, Nov. Mant.* iii. 31; *Summa*, 156; *Herb. Norm.* xii. 51. *Malmg. Fl. Spitzb. in Seem. Journ.* ii. 141. *Syme, E. B.* ii. 124, *t.* 205 *bis.*

Arenaria cæspitosa, *Vahl, in Fl. Dan. t.* 2289.

The peduncles are apparently never hooked at the end; they are very short, rarely exceeding a quarter of an inch in length. The flowers and fruits are small and rather narrowed downwards. The sepals are very blunt, and have a white diaphanous margin. The ripe capsule does not greatly exceed the adpressed calyx. The branches and central stem appear to subdivide very frequently, and are, on the specimens from Ben Lawers, about an inch and a half long, but shorter on those from Norway.

TWO NEW SPECIES OF CITRIOSMA, FROM BRAZIL.

By Berthold Seemann, Ph.D., F.L.S.

In May last my attention was directed to two hot-house plants, cultivated without a name, in the garden of M. J. Linden, at Brussels. They had been introduced by him from the province of St. Catharina, Brazil, and their leaves emitted, on being touched, a very agreeable odour, which was found to originate in a number of minute oily dots with which the leaves were covered, the odour being different in both. I recognized in them two species of *Citriosma*, and on my return to

London I looked through our herbaria, but did not find them, nor are they described in Tulasne's 'Monographia Monimiacearum' (Arch. du Mus. vol. viii. 1855). I therefore assume them to be new; and as for mercantile purposes it is desirable that they should have names, I have given them those of *Citriosma Thea* and *C. Lindeni*, though they have not yet flowered.

1. *C. Thea*, Seem. sp. nov. Fruticosa; ramulis rufis sub-4-angulatis hirtellis, foliis oppositis oblongis acuminatis basi in petiolum pubescentem attenuatis, undulato-denticulatis, utrinque glabris, glandulis pellucidis odorem theæformem scatentibus instructis, subtus pallidioribus, petiolis rufis; floribus ignotis.—Prov. of St. Catharina, Brazil.

Leaves membranous, emitting a delicious tea-like smell, 3 inches long, 1 inch broad; petiole 2 lines long.

2. *C. Lindeni*, Seem. sp. nov. Fruticosa; ramulis rufis teretibus minute hirtellis, foliis oppositis ellipticis acuminatis minute denticulatis, basi acutis, utrinque glabris, glandulis pellucidis citriodoris instructis, subtus pallidioribus, petiolis (1 lin. long.) viridibus; floribus ignotis.—Prov. of St. Catharina, Brazil.

Leaves membranaceous, emitting a citron-like smell, $1\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches broad; petiole 1 line long. The whole plant in every respect smaller and more delicate-looking than *C. Thea*.

NEW BRITISH EPIPHYTAL FUNGI.

By M. C. Cooke, Esq.

Three species of microscopic fungi belonging to the genus *Trichobasis*, Lev., apparently undescribed, having lately been found in Britain, their descriptions are here given, in order that they may be looked for in other parts of Europe.

Trichobasis Hydrocotyles, n. sp. Epi- rarius hypophylla; acervulis subrotundis sparsis confluentibusque fusco-brunneis, epidermide rupta cinctis; sporis subglobosis, tandem brunneis, asperis. Hab. in foliis *Hydrocotylis*.—Without definite spots. Sori occurring chiefly on the upper surface of the leaves, sometimes on the lower; scattered, variable in size, roundish, erumpent, surrounded by the ruptured epidermis. Spores subglobose, at length brown; epispore rough with

minute tubercles.—Highbeach and other parts of Epping, from July to September, 1863 and 1864.—Closely resembling *Uredo Hydrocotyles*, Mont., and *U. Hydrocotyles*, Ravenal. The former found in Chili and France, the latter in South Carolina. The presence of distinct peduncles in the early stage of our plant is evidence of its not being a true *Uredo*.

Trichobasis Parnassiæ, n. sp. Acervulis amphigenis, bullatis, demum erumpentibus, sparsis, rotundatis, confluentibusque. Sporis globosis vel subovatis, fuscis. Hab. in foliis *Parnassiæ*.—On both surfaces of the leaves. Sori at first bullate, at length rupturing the epidermis, scattered, often confluent. Spores globose, or nearly so, rather large, tawny-brown. This species was only found on a small marsh, beside the river, near Irstead church, Norfolk, September, 1864. Thousands of plants of *Parnassia palustris* on other and neighbouring marshes, failed to yield a single specimen of this *Trichobasis*.

Trichobasis Rhamni, n. sp. Maculis flavidis. Acervulis hypophyllis, rotundatis, minutissimis sparsis vel aggregatis. Sporis subglobosis, tandem dilute ferrugineis. Hab. in foliis *Rhamni*. Autumn.—Seated on definite yellowish spots. Sori occurring only on the under surface of the leaves, scattered or collected in clusters, very minute, roundish or oblong. Spores at length rusty-brown, subglobose.—Found on the leaves of *Rhamnus catharticus*, at Selsdon, Surrey, September 16, 1864 (Mr. A. Grugeon).—This is a very distinct species, both in the definite spots on which the pustules are seated and in the very minuteness of the pustules themselves.

CORRESPONDENCE.

Double Orchids.

Rye Lane, Peckham, S.E., October 4.

I observe in the last number of the Journal (p. 319) that Dr. Moore is interested in the double-flowered *Orchis Morio*, mentioned on my authority in your list of double flowers. Will you allow me to say that the list I sent you was in great measure a compilation from various sources; that I personally have not seen a double-flowered *O. Morio*, but cited it from Jacob's 'Catalogue of Faversham Plants' (1777), one of the earliest local Floras of this country? At p. 75 of that work, it is mentioned that "in a meadow near Cades, in Ospringe,

some" of these plants were found with flowers "of a rose colour, some white, and a very few with double flowers." No further description is given, nor does the accompanying engraving shed much light upon the matter. According to the figure, the flowers have a circular outline, seem very double, and apparently have no nectaries; all the flowers of the spike are alike affected.

The *Ophrys aranifera* included in your supplemental list was only semi-double. It had three lips, one in the ordinary position and two lateral ones, representing the two lateral stamens of the outer series, which are usually suppressed; on one of these additional labella was an imperfect anther. In addition, the three inner stamens, which are generally wholly suppressed, were in this instance all present. A description and figure of this highly interesting specimen will be published in a future part of the Journal of the Linnean Society.

Through the kindness of Prof. Asa Gray and Mr. Darwin, I am enabled to record another double Orchid, which presented almost precisely similar changes to those found by me in *O. aranifera*. The plant in question is *Pogonia ophioglossoides*, and was found by Dr. J. Paine in a bog near Utica, New York. This American Orchid, and especially my *O. aranifera*, go far to confirm Brown's view of the structure of the Orchideous flower,—a view adopted and confirmed by Darwin.* For further remarks on this interesting subject I must refer you to the forth coming part of the Journal of the Linnean Society.

Dr. Moore has favoured me by forwarding some flowers of *Orchis pyramidalis* similar to those mentioned by him in the last number of the Journal, but even more curious. In the flowers I examined there were the three sepals as usual; within these a double, and, in some instances, triple whorl of petals, most of the latter being lip-like in form and colour. I could find no trace whatever of ovary or column, of pollen or nectary; but standing up in the centre of the flower, in the place usually filled by the column, was a small raceme, consisting of numerous bracts subtending a number of flower-buds. These latter were made up (so far as their structure and arrangement could be made out) of three sepals, enclosing some rudimentary petals, and these again encircling a prolonged axis with minute bracts and rudimentary flowers! The smallest of these tertiary flower-buds that I examined measured 1·100 inch in diameter, and consisted merely of a central dome or pimple of cellular tissue, encircled at the base by a shallow cup, whose edge was slightly three-lobed, the lobes indicating possibly the future sepals. In other minute buds the central dome was surrounded at the base by a four, five, or six-lobed cup; but as it was impossible to make sufficiently accurate examination of these rudimentary buds, I refrain from giving further details, but will merely add that these flowers present, so far as I am aware, the only recorded instance of median floral prolification in Orchids.

Mr. Currey forwarded me some time since a flower of *Oncidium* sp., which I may term spuriously double; the sepals and two upper petals were normal, but the lip was divided into three all but separate pieces, confluent with the

* 'Fertilization of Orchids,' p. 292.

base of the column; each of the subdivisions had a callosity in the centre of the "claw," in the case of the median segment, close to the upper and inner edge in the lateral segments. Query, do these callosities represent the outer two lateral stamens and one of the inner stamens?—their position justifies such an assumption. The flower in question had no ovary, although the column was present, bearing below a stigma, at the sides two triangular membranous wings,—representatives possibly of the two upper and inner stamens, —and above an abortive pollenless anther.

In conclusion, I will take the liberty of soliciting those of your readers who may meet with any malformations in plants to allow me the opportunity of inspecting them, should it be consistent with their convenience thus to favour me.

Yours, etc.,
MAXWELL T. MASTERS.

Tulipa sylvestris *and* Cephalanthera rubra, *in Gloucestershire.*

Gloucester, October 3, 1864.

This year I found a new habitat of *Tulipa sylvestris* near Gloucester, in a wood,—some 5000 plants,—but could not procure a single blossom. I believe that unless this species grows along with grass (in our country) it will not bloom. I think I was the first discoverer of *Tulipa sylvestris* in our county, having gathered in 1856 four flowering specimens of it.

This year I collected specimens of our rarest Gloucestershire plant, *Cephalanthera rubra*, one of which was sent to Mr. Syme. I have also received the following letter respecting the first discoverer of this Orchid in our county, and I may add that I have also made several unsuccessful searches for the plant on Frocester Hill. Babington, in the fifth edition of his Manual, mentions Stout's Hill, and the specimens I gathered this year were found close by there.

Yours, etc.,
G. S. WINTLE.

"*Hardwicke Court, September* 14, 1864.

"My grandfather, the Rev. W. Lloyd Baker, of Stoutshill Uley, found what was then called the *Serapias rubra* growing, as I have been told, near the top of Frocester Hill, and for many years gathered such specimens as he could without much decreasing the stock. I have, however, since gone over the ground with Professor Buckman without finding a trace of it. My grandfather gave it to Withering, who acknowledged the plant in his next edition. I have a portrait of my grandfather, with a drawing of the plant in his hand. He always said that the finding of it was the foundation of his *hortus siccus*. I have also a specimen of the plant in his collection.

"Yours, etc.,
"J. B. H. BAKER."

NEW PUBLICATIONS.

Handbook of the New Zealand Flora; a Systematic Description of the Native Plants of New Zealand, and the Chatham, Kermadec's, Lord Auckland's, Campbell's, and Macquarrie's Islands. By J. D. Hooker, M.D., F.R.S., etc. Lovell Reeve. 8vo. 1864.

Until the appearance of this Handbook, Dr. Hooker's 'Flora Novæ-Zelandiæ,' which formed a portion of the author's botany of the Antarctic voyage, was the most complete enumeration that had as yet been published of the plants of New Zealand. But the 'Flora Novæ-Zelandiæ' consists of two large quarto volumes, admirable in a library, but little suited for being carried about in the baggage of the travelling naturalist, amongst the unexplored wilds of the country of the Maoris. The present handbook, by its shape and portability, is a far better travelling companion, and by its lower price is placed within the reach of all those who could not afford to purchase the larger and earlier Flora of the author's. We are indebted, it appears, to Dr. Knight, F.L.S., Auditor General, and other gentlemen interested in the natural history of the islands for suggesting the present publication and obtaining the necessary funds for it, including a liberal remuneration for the author's services.

The Handbook may be regarded as a second revised edition of the 'Flora Novæ-Zelandiæ,' with the illustrations left out, and all the new discoveries of Messrs. Haast, Travers, Sinclair, Rough, and other zealous botanists added. It will therefore prove acceptable to even those who already possess the quarto work. In Part 1., now before us, we have six new genera and 140 new species, a list of which will at once show the real value of the additions.

Ranunculus Lyallii, *H. f.*
R. Traversii, *H. f.*
R. Buchanani, *H. f.*
R. Haastii, *H. f.*
R. crithmifolius, *H. f.*
R. sericophyllus, *H. f.*
R. Sinclairi, *H. f.*
R. gracilipes, *H. f.*
R. pachyrrhizus, *H. f.*
Sisymbrium Novæ-Zelandiæ, *H. f.*
Braya Novæ-Zelandiæ, *H. f.*
Lepidium sisymbroides, *H. f.*
Nothothlaspi (gen. nov. Cruciferarum) rosulatum, *H. f.*
Viola Lyallii, *H. f.*
Pittosporum patulum, *H. f.*
Stellaria Roughii, *H. f.*
Colobanthus acicularis, *H. f.*
Hectorella (gen. nov. Portulacearum) cæspitosa, *H. f.*
Hoheria Sinclairii, *H. f.*
Aristotelia Colensoi, *H. f.*

Pomaderris Edgerleyi, *H. f.*
Coriaria angustissima, *H. f.*
Carmichaelia crassicaulis, *H. f.*
C. Munroi, *H. f.*
C. nana, *Colen.*
C. grandiflora, *H. f.*
Nothospartium (gen. nov. Legumi-
nos.) Carmichaelii, *H. f.*
Swainsonia Novæ-Zelandiæ, *H. f.*
Acæna Buchanani, *H. f.*
Tillæa Sinclairii, *H. f.*
Gunnera densiflora, *H. f.*
Epilobium purpuratum, *H. f.*
Pozoa exigua, *H. f.*
P. Haastii, *H. f.*
P. hydrocotyloides, *H. f.*
P. Roughii, *H. f.*
Oreomyrrhis Haastii, *H. f.*
O. ramosa, *H. f.*
Aciphylla Colensoi, *H. f.*
A. Lyallii, *H. f.*
A. Dobsoni, *H. f.*
Ligusticum Haastii, *F. Muell.*
L. brevistyle, *H. f.*
L. (?) filifolium, *H. f.*
L. (?) carnulosum, *H. f.*
L. piliferum, *H. f.*
L. imbricatum, *H. f.*
L. (?) trifoliolatum, *H. f.*
Angelica decipiens, *H. f.*
Panax longissimum, *H. f.*
P. Sinclairii, *H. f.*
Viscum Lindsayi, *Oliver.*
Coprosma Cunninghami, *H. f.*
C. Colensoi, *H. f.*
Olearia moschata, *H. f.*
O. Hectori, *H. f.*
Celmisia densiflora, *H. f.*
C. Haastii, *H. f.*
C. Lindsayi, *H. f.*
C. Sinclairii, *H. f.*
C. Munroi, *H. f.*
C. Lyalli, *H. f.*
C. viscosa, *H. f.*
C. petiolata, *H. f.*
C. Traversii, *H. f.*
C. Hectori, *H. f.*
C. sessiliflora, *H. f.*
C. bellidioides, *H. f.*
Brachycome Sinclairii, *H. f.*
B. odorata, *H. f.*
B. pinnata, *H. f.*
Cotula atrata, *H. f.*
C. filiformis, *H. f.*
C. pectinata, *H. f.*
C. pyrethrifolia, *H. f.*
Raoulia Haastii, *H. f.*
R. Munroi, *H. f.*
R. subulata, *H. f.*
R. eximia, *H. f.*
R. Hectori, *H. f.*
R. mammilaris, *H. f.*
Gnaphalium (Helichrysum) Youngii,
H. f.
G. (Helichr.) Sinclairii, *H. f.*
G. Traversii, *H. f.*
G. nitidulum, *H. f.*
G. (Helichrys.) grandiceps, *H. f.*
Haastia (gen. nov. Compositearum)
pulvinaris, *H. f.*
H. recurva, *H. f.*
H. Sinclairi, *H. f.*
Erechtites scaberula, *H. f.*
Senecio Haastii, *H. f.*
S. cassinoides, *H. f.*
Traversia (gen. nov. Composit.) bac-
caroides, *H. f.*
Crepis Novæ-Zelandiæ, *H. f.*
Helophyllum rubrum, *H. f.*
Stylidium (?) subulatum, *H. f.*
Wahlenbergia cartilaginea, *H. f.*
Lobelia Roughii, *H. f.*
Pratia (?) macrodon, *H. f.*
P. (?) linnæoides, *H. f.*
Epacris Sinclairii, *H. f.*
Archeria Traversii, *H. f.*
Dracophyllum uniflorum, *H. f.*
D. muscoides, *H. f.*

Logania tetragona, *H. f.*
Myosotis uniflora, *H. f.*
M. pulvinaris, *H. f.*
M. Hectori, *H. f.*
M. Traversii, *H. f.*
Exarrhena macrantha, *H. f.*
Veronica Traversii, *H. f.*
V. vernicosa, *H. f.*
V. carnosula, *H. f.*
V. pinguifolia, *H. f.*
V. Buchanani, *H. f.*
V. lycopodioides, *H. f.*
V. tetrasticha, *H. f.*
V. Hectori, *H. f.*
V. salicornoides, *H. f.*
V. cupressoides, *H. f.*
V. Haastii, *H. f.*
V. epacridea, *H. f.*
V. macrantha, *H. f.*
V. Raoulii, *H. f.*
V. linifolia, *H. f.*
Pygmea (gen. nov. Scrophular.) ciliolata, *H. f.*
P. pulvinaris, *H. f.*
Ourisia Colensoi, *H. f.*
O. sessilifolia, *H. f.*
O. glandulosa, *H. f.*
Euphrasia Munroi, *H. f.*
Plantago lanigera, *H. f.*
Pimelia Traversii, *H. f.*
P. buxifolia, *H. f.*
P. sericeo-vitiosa, *H. f.*
Libocedrus Bidwilli, *H. f.*
Luzula pumila, *H. f.*
L. Colensoi, *H. f.*
Isolepis basilaris, *H. f.*
Uncinia Sinclairii, *Booth.*
Agrostis avenoides, *H. f.*
A. Youngii, *H. f.*
Danthonia flavescens, *H. f.*
D. Buchanani, *H. f.*
Trisetum Youngii, *H. f.*
Poa exigua, *H. f.*
P. Colensoi, *H. f.*
P. Lindsayi, *H. f.*
Triticum Youngii, *H. f.*
Cyathus Milnei, *Hook.*

In this list have been omitted all the species known from other localities, and now for the first time admitted into the New Zealand flora. Want of space also compels us to refrain from pointing out the numerous changes of names which older species have necessarily undergone. We are pleased to see a good many plants, regarded as mere varieties in the quarto edition, now raised to the rank of independent species,—a change for the better in an author who is far in advance of nearly all his contemporaries in a tendency to lump species together.

Dr. Hooker begs that any imperfections discovered in his book may be pointed out, so that they may be corrected in a second edition. One of the faults of the quarto Flora, amongst its many admitted excellences, was, that it omitted all the Mosses which had been published four years previously (1851) by Carl Mueller in the Bot. Zeitung, and that it made no mention of Endlicher's critical list of South Sea Island plants, published in 1836 in the Annals of the Vienna Museum, though it contained the most complete enumeration of New Zealand plants that had been made known previous to the great work of

Hooker. In the present handbook Endlicher's list is again neglected. This is the more to be regretted, as it affects the synonymy and authority of several species. The following names struck us as absent from Hooker's Handbook:—

Hierochloe Banksiana, Endl.=*H. redolens*, R. Brown.
Arundo Richardii, Endl.=*A. australis*, Rich.
Cordyline australis, Endl. Norfolk Isl.=*Dracæna australis*, Forst.
Astelia Richardii, Endl.
Podocarpus Matai, Bennett in Lambert, Pin.
Polygonum Forsteri, Endl.=*Muhlenbeckia adpressa*, Lab.
Senecio Reinoldi, Endl. (1836)=*S. rotundifolius*, Hook. fil. (1853).
Senecio Georgii, Endl.=*Brachyglottis repanda*, Forst.

One of the new *Panax* (*P. longissimum*, Hook. fil.) was described five years ago by Regel, of St. Petersburg, as *P. coriaceum* ('Gartenflora,' 1859, p. 45), and is doubtless nothing but a variety of *Pseudopanax crassifolium*. We have seen as many as twenty varieties raised by Continental nurserymen from seed produced by *Pseudopanax crassifolium*. The authority for *Meryta Sinclairii* is Seemann, who several years ago published that name in the 'Bonplandia.' We should also have liked to see some notice taken of the changes that Planchon and C. Koch have proposed with regard to *Cordyline*.

The general plan of the work is that adopted in Bentham's 'Hongkong Flora.' It is written entirely in English, and there is an analytical key prefixed to the Natural Orders and genera extremely useful to the student. The second part, containing the lower Cryptogams, is shortly to appear, and will enable us to return once more to this valuable work.

A Flora of Harrow. By J. C. Melvill. London: Longmans. 1864.

"Magni sanè erit momenti si juvenes plantas sibi proximè natas observare vellent, tunc enim spes esset ut historia plantarum generalis hujus insulæ reddatur absoluta, cujus utilitas benè cognita est." So says Blackstone in the preface to his 'Catalogue of Harefield Plants,' printed in 1737, which contained the names of no less than 524 plants, many of them however only slight varieties, and which is the only other published local Flora for any part of the county of Middle-

sex. The good advice of this ancient botanist has been followed at Harrow school, and the result is the little book whose title is given above. The preface tells us that the work has been entirely drawn up by Harrow boys, and that it is published "from a very strong desire to promote at Harrow an interest in natural history." It is very satisfactory to find this taste growing in our large schools: not only is it excellent employment for the boys, combining in its prosecution health, profit, and pleasure, but it is also instrumental in training them up to be accurate observers and reasoners, whilst it is of benefit to science at large through the record of numerous observations in a given district. It is to be hoped that the example of Marlborough and Harrow will be followed by other large schools.

The flora of this portion of Middlesex is, as might be expected, neither varied nor extensive, and though extended observation will doubtless discover more species, especially amongst the less generally known groups, such as the Grasses and Cyperaceæ, yet it is probable that such additions will be few in number, and that the plants of the neighbourhood may be considered as pretty completely elucidated. As it is, however, the efficacy of continued exertions and renewed search in even a poor district is well shown by the increase in number of recorded species and varieties from 539 in Mr. Hind's list, published in 1861, to 617, the number included in the present Flora. The extent of the district included is about sixty square miles, and the book is furnished with the Ordnance survey of the neighbourhood.

The list of plants consists mainly of the commonly distributed plants of the Thames basin, with a sprinkling of *rariores*, which relieves its monotony. There are some remarkable desiderata. *Caltha palustris* does not occur wild, though there are numerous suitable localities for its growth, nor has *Lychnis vespertina*, *Asperula odorata*, or *Erica cinerea* been met with by Harrow botanists, though it is probable that they all occur, as all are found both at Hampstead and in the Harefield district. *Senecio Jacobæa* must surely be a Harrow species, though not included in its flora; *S. erucæfolius* is there stated to be "very abundant," and may be an error, the commoner species being intended. Both, however, are included in Mr. Hind's catalogue. There are several other plants omitted from the Flora which are given as natives by Mr. Hind, amongst them *Ranunculus sceleratus*,

Prunus Cerasus, *Hypochæris radicata*, *Myosotis sylvatica?*, *Origanum vulgare*, *Callitriche platycarpa*, and *Carex panicea*,—all likely species to occur; have they become extinct since 1861? *Atriplex Babingtonii* is generally a seashore plant, said to be found at Roxeth in the Flora.

Though there are signs of the juvenile authorship of the book, yet it is remarkably free from improbabilities or obvious errors; it has doubtless had the benefit of Mr. Hind's supervision; indeed his assistance is acknowledged in the preface, and his initials appear on nearly every page.

Though a part of the district, the neighbourhood of Stanmore and Edgware seems to have less attention paid to it than the country nearer Harrow; a good list of plants might be easily given for that part, including species not enumerated in the Flora. Is *Primula elatior*, found near Harrow and Pinner and in Bentley Priory, anything more than a hybrid form?

There are notices of the birds of the district and a copious entomological list with the Flora. The book is well printed and got up, and is, on the whole, most creditable to the school.

Diagnoses d'Espèces nouvelles ou méconnues, pour servir de Matériaux à une Flore réformée de la France et des contrées voisines. Par Alexis Jordan. Tome premier, première partie. Paris: F. Savy, 1864.

Monsieur Jordan is far too well known as a botanist to need any introduction to our readers. He is the founder of a school of writers on species-botany, of which the leading article of faith is that a large number of the plants which have been taken by all authors, from the time of Linnæus downwards, for single species, are in reality made up of a number of, it may be very closely resembling, permanent forms. To these, they say, permanence of character being the sole practical test we have of what constitutes a species, we cannot, upon any principle of consistency, refuse that rank and title; and to the seeking out and definition of these M. Jordan has, as the botanical work of his life, devoted himself. It is now nearly a quarter of a century since his first writings were published. The book of which the title stands at the head of our notice is merely the first instalment of a work which is

intended to explain in the fullest detail the result of his investigations. The following passage contains the essence of his introductory explanation respecting its plan and purpose :—

"Let us say it at the outset, we have not in our investigations quitted for a moment the domain of positive reality. It is not theories, but absolute facts, that we have to show. It is not a certain manner of looking at things, or a particular opinion that is to be brought in question, but facts duly and truly ascertained by means of the ordinary process of experience, that we are going to submit, without fear, to the circumspection of all friends of science. We have simply to unfold that which we have seen, experimentized upon, sought out; that which even those who may be most disposed to contradict us would have seen and sought out as we have done, or better than we have done, if they had made the same researches, with similar materials to ours. In fact, it is easy to understand, when there exist between plants observed in a living state, and in a condition of perfectly analogous development, differences which are easily appreciable by any one who knows how to look attentively, that to ascertain the existence of these differences is to ascertain a material fact of the reality of which there cannot be two opinions. To ascertain afterwards that these differences are visible year by year and every year is again to ascertain a material fact of the same nature as the preceding. To ascertain finally that these are differences presented constantly by different individual plants when they are compared together, presented equally by other individuals which are descended from these last, that they are produced hereditarily and invariably through a succession of generations, it is always the investigation of a question of a material fact to get to know whether these differences exist or they do not. Sincere men may differ in opinion as to the consequences to be deduced from the fact, but they cannot, if they take the necessary pains to look, doubt as to its reality or non-reality. The species which we have to propose are nothing else but vegetable forms which we have learnt to distinguish from one another by the comparison of all their organs in the living plant; and we have assured ourselves by the most certain observations that the differences are hereditary, and cannot be attributed to local or accidental causes."

This is sound sense and sound reasoning, the language of a man conscious of sincerity. It places the issue of the innumerable questions

at point upon the foundation where they ought to rest. But when M. Jordan talks about Pantheism as the result of Darwinism, he, in our opinion, spoils his preface. It is just as easy for one side as the other in the species controversy to make imputations of this kind, and such never do any good, and often a great deal of harm. It is no inevitable consequence that a man who believes that the original specific types have been few in number, and that the forms we now see have been modified from them through long ages, should not be as sincere and orthodox a Christian as the man who believes that the original specific types have been many, and that each has remained as it was when created up to the present time without material change. We object utterly to the introduction of theology into the argument. Such imputations can only create bitterness of feeling, which is the very thing of all others most likely to prevent the calm investigation of facts.

We do not intend, upon the present occasion, to discuss either the general bearing upon the species question of M. Jordan's labours, or to pass any opinion upon the points of detail here brought before our notice. We are none of us in a position, at the present time, to judge what the value of his work really is, or what amount of truth the central idea of his school contains. It is time and work—work in the peculiar way of which he has set so industrious an example, the careful study of living plants by means of cultivation—that must be the test of these. And a notice of this character is not the right place for a criticism on points of detail, because that criticism ought always to have for its foundation statements resting upon some distinct personal authority.

The portion of the work which is contained in this issue only goes through three Natural Orders—*Ranunculaceæ*, *Papaveraceæ*, and *Cruciferæ*. We understand that it is intended that plates illustrative of the letterpress should ultimately be published, but there are none here, and we do not see the promise of any. With very rare exception, only forms proposed as species by M. Jordan himself are described, but no uniform rule seems to be followed with regard to the species described in his former works. Sometimes they are and sometimes they are not described here over again. The diagnoses are in Latin, the rest of the book of course in French. The following are the British species which are divided, or to which those proposed are nearly allied :—

Allied to or dissevered from—	*Species of Jordan.*
Clematis Vitalba...	1
Thalictrum minus *and* flexuosum	8
„ flavum	5
Anemone Pulsatilla	4
Ranunculus auricomus	1
„ acris	6
„ bulbosus	4
„ repens	1
Aquilegia vulgaris	4
Papaver dubium	6
„ Rhœas	8
Barbarea vulgaris	1
„ præcox	4
Arabis hirsuta *and* ciliata...	18
Cardamine pratensis	3
Sisymbrium officinale	2
Alyssum calycinum	7
Draba aizoides	3
„ verna	53
Thlaspi perfoliatum	2
„ alpestre	16
Iberis amara	4
Lepidium campestre	3
Capsella Bursa-pastoris	5
Cakile maritima...	4
Total number, 27.	174

Taking this table in connection with the paragraph quoted from the preface, it must be confessed that this is the beginning of a very extraordinary book. The question is, to what extent can other observers verify or effectually contradict its statements.

Monographie des Bignoniacées ; ou Histoire Générale et Particulière des Plantes qui composent cet Ordre Naturel. Par Édouard Bureau. Paris, 1864. 4to. With an Atlas.

We believe that we shall commit no mistake when stating that the letterpress of this important work, though bearing the date of 1864 on the title-page, was printed off more than two years ago, and that only the few pages accompanying the atlas were actually printed this year. This explains why different generic names are used in the body of the work to what there are on the plates and the letterpress accom-

panying them. This also explains why apparently no notice is taken of several publications bearing upon the subject which were issued in 1863 and early in 1864. It thus happens that, amongst others, Mr. Miers's important paper in the Proceedings of the Horticultural Society of London, vol. iii. p. 179 (May, 1863), is not mentioned. In that place Mr. Miers forestalls M. Bureau in the publication of several new genera. For instance, Mr. Miers's *Pleonotoma* is M. Bureau's *Clematitaria*; and Miers's *Tynanthus*=*Schizopsis*, Bureau. It is really high time that botanists should come to some understanding about what is to be regarded as the type of *Bignonia*. Of the old Linnæan species referred to this genus only five now remain—*B. Unguis-cati*, *æquinoctialis*, *capreolata*, *pubescens*, and *Peruviana*. *B. Peruviana* (as long ago shown in 'Bonplandia,' vii. p. 274) is identical with *Vitis bipinnata*; *B. pubescens* cannot be used as the type of the genus, because, there being no specimen of it in the Linnæan herbarium, we are left in doubt what species Linnæus comprehended under that name; whilst *B. Unguis* has been converted into the genus *Doxantha* by Miers, *B. æquinoctialis* into *Cydista* by Miers, and *B. capreolata* into *Anisostichus* by Boreau. So that the genus *Bignonia* would exist no longer, except as a receptacle of species not yet examined by any competent authority. M. Bureau wishes to retain the name *Bignonia* for *B. Unguis*, but he did not know of Mr. Miers's proceeding when he expressed that opinion.

We have, as yet, only the first instalment of this valuable work, and must reserve a fuller notice for some future occasion. It is well known that various opinions are entertained by the leading botanists respecting the limits which should be assigned to the Natural Order *Bignoniaceæ*. Mr. Miers, in his various publications on the subject, considerably extended the boundaries, but M. Bureau restricts it to *Eubignonieæ*, *Tecomeæ*, and *Crescentiaceæ*, and points out the following absolute characters by which this Natural Order may be known:—"Bisexual and complete flowers; a gamosepalous calyx, with lobes valvate in æstivation; a monopetalous corolla; introrse anthers, opening longitudinally; a 2-celled ovary; simple style; a 2-lobed stigma; two distinct placentæ in each cell, each bearing an indefinite number of ovules and placed right and left of the naked central part of the dissepiment; anatropous ovules, composed of a nucleus and single envelope, with the raphe inward, and the micropyle outwards; seeds numerous, and without albumen."

The author notices one by one the genera which at various times have been referred to *Bignoniaceæ*, and frees the order of many elements foreign to it, confirming in most instances the opinions which leading botanists have already expressed about their position. Amongst the foreign elements we find *Fagræa* referred to *Gentianeæ*, *Gelsemium* to *Apocyneæ*, *Henriquezia* and *Platycarpum* to *Rubiaceæ*, and *Schrebera* to *Oleaceæ*. De Candolle assigned to *Schrebera* a place at the end of *Jasmineæ* (having nothing to rely upon save Roxburgh's figure and description), but he placed the genus *Nathusia*, which we hold to be closely allied to, if not identical with it, and of which Dr. Welwitsch has species with simple and compound leaves, in *Oleaceæ*.

The parts now published contain a general introduction; the literary history of these plants brought down to 1862; researches into the types and grouping of the genera; definition of the Order; and organography. It is understood that an enumeration of the genera and species is to follow. The atlas contains thirty-one plates by M. Faguet, executed with great care, and representing,—1. *Fridericia speciosa*, Mart.; 2. *Arrabidæa Agnus-castus*, De Cand.; 3. *Cuspidaria erubescens*; 4. *Pachyptera foveolata*, De Cand. [is not this identical with *Adenocalymna? brachybotrys*, De Cand., and *Bignonia Kerere*, Aubl. non Lindl.?]; 5. *Adenocalymna nitidum*, Mart.; 6. *Anisostichus capreolata* [has previously been called *Doxantha capreolata* by Miers]; 7. *Bignonia Unguis*, Linn.; 8. *Millingtonia hortensis*, Linn. fil.; 9. *Calosanthus Indica*, Blume; 10. *Anemopægma læve*, De Cand.; 11. *Macrodiscus rigescens* (*Distictis rigescens*, De Cand.); 12. *Amphilophium molle*, Cham. et Schlecht.; 13. *Stenolobium stans*, Seem.; 14. *Campsis radicans*, Seem. (*Tecoma radicans*, Juss.); 15. *Newbouldia lævis*, Seem.; *Delostoma nervosum*, De Cand. [this species differs from the typical species of the genus by having a simple, not a double calyx]; 17. *Cybistax antisyphilitica*, Mart.; 18. *Zeyhera montana*, Mart.; 19. *Rhigozum trichotomum*, Burch.; 20. *Pajanelia multijuga*, De Cand.; 21. *Jacaranda tomentosa*, Brown, et *J. Copaia*, Don; 22. *Argylia puberula*, De Cand.; 23. *Incarvillea Sinensis*, Lam.; 24. *Amphicome arguta*, Lindl.; 25. *Catalpa bignonioides*, Walt.; 26. *Sparathosperma lithrontripticum*, Mart.; 27. *Spathodea crispa*, Wall. [belongs to the genus *Dolichandrone*]; 28. *Radermacheria stricta*, Zoll.; 29. *Stereospermum dentatum*, A. Rich.; 30. *Eccremocarpus scaber*, R. et Pav.; 31. *Tourretia Lappacea*, Willd.

MEMORANDA.

TIMBER TREES OF VICTORIA.—The Victorian timber-trees, with few exceptions, are not likely to bear the climate of Britain; and in the south of England and Ireland, where a few species have been acclimatized, they can only be viewed as objects of curiosity or ornament. But in warmer regions, especially beyond the tropics, where it is of importance to raise trees in woodless districts, none could be chosen for this purpose surpassing and but few equalling certain species of ours in rapidity of growth. Thus in Natal, and in other countries where fuel is excessively scarce, they might be raised most readily from seeds in the utmost profusion. In some of the lower regions and plateaus of the highlands of India our trees would be equally eligible for raising shelter plantations, and furnishing, finally, fuel and material for artisans. The most important timber-tree which we can offer is the Blue Gum tree (*Eucalyptus Globulus*). It is most readily raised from seeds; and the seedlings, when a few months old, are easily transplanted during cool and humid weather. In rapidity of growth this tree excels perhaps all other trees of the globe; in regard to size, it must be reckoned amongst the most gigantic productions of the vegetation of the world; for durability of its timber, and its resistance against decay as well in water as underground, it is excellent, and it is eligible for most purposes where a hard and heavy wood is needed. The tree, although chiefly a natural production of humid valleys, nevertheless resists well the influence of great heat and of hot winds. Several other *Eucalypti* are of nearly as much importance for introduction into several of the British colonies. Thus the Red Gum tree (*Eucalyptus rostrata*) grows also with remarkable celerity, and is recommended especially for plantations in depressed ground. Its wood is extremely durable, very suitable for underground work, piles of wharves, etc., susceptible of an excellent polish, and affords superior fuel. It is, like all other *Eucalypti*, most readily raised from seeds. *Eucalyptus amygdalina* is also a timber-tree of quick growth, and besides is remarkable for the extreme abundance of volatile oil in its foliage. The Stringy Bark tree (*E. obliqua*) is the most to be recommended where a tree is sought for extensive plantations on barren ranges, and where a fissile wood for fencing purposes is required; it attains also gigantic dimensions, and its stem is almost invariably of a beautiful straightness. The bark furnishes material for rough paper. The other large *Eucalypti* eligible as timber-trees are *E. goniocalyx*, *E. corymbosa*, *E. botryoides*, *E. Woollsii*, *E. coriacea*, *E. Leucoxylon*, *E. Gunnii*, *E. viminalis*, *E. odorata*, and *E. persicifolia*. The last is the famous Ironbark-tree, so singular for the toughness and durability of its wood. Some *Acaciæ* of Victoria are also of great celerity of growth, amongst which *A. mollissima* is the most eligible. It is, however, neither a large nor a lasting tree, but of great value for the quick shelter it affords when raised for protection of other plantations; it yields moreover a gum similar to that of gum arabic, and also a good kind of tanner's bark. The W. Australian *Acacia lophantha*, generally introduced here, is also highly suitable for the quickness of its growth and readiness with which it can be raised as a temporary shelter tree, though never attaining a large size. Of all our *Acaciæ*, however, the most valuable is the Blackwood-tree (*Acacia Me-*

lanoxylon), on account of its beautiful wood, which has been with the greatest advantage used for elegant and durable cabinet-work, for railway carriages, etc. The tree attains great dimensions in fertile, especially irrigated ground, and is readily raised from seeds. *Acacia homalophylla*, though but a small tree, is much sought for its dark, scented, heavy wood, well known as the Myall-wood; this plant is restricted to the desert country.—*Papers of Victorian Acclimatization Society.*

BOTANICAL NEWS.

Our readers will observe that in consequence of the great demand made upon our space, we have been obliged to give, both last month and this, several extra pages.

Dr. F. Hegelmaier, of Tübingen, whose paper on the Callitriches has given so much satisfaction, is now writing a monograph of the Lemnaceæ, and would be glad if botanists would supply him with materials.

Mr. Baker, of Thirsk, has addressed a letter to those botanical friends who, in appreciation of his scientific services, have subscribed to replace his burnt library and herbarium. "The subscription," says Mr. Baker, "which you have united to make, is far more than sufficient to replace all my botanical belongings which money can restore." This is indeed gratifying to all, and must be especially so to the Committee who, in so satisfactory a manner, managed this affair. It is surely a subject of congratulation that so many should have come forward on this occasion who were personally unknown to Mr. Baker, and that an interest in botany, and a wish to help one of its most devoted servants over a temporary difficulty, should be the foundation upon which such acts of kindness rest.

Mr. Storck writes to us from the Viti Islands, that the cultivation of cotton is extending, and that about twenty-four planters have established themselves. He has found several plants new to the Fijian flora, amongst them two *Pandaneæ*, called respectively Dridriwai and Dridriwai-vula.

In May, 1863, Dr. L. Rabenhorst, of Dresden, and Dr. W. Ph. Schimper, of Strasburg, founded a society for the purpose of exploring the Cryptogamic floras of different countries, and we understand that the plan has been successful. Every one subscribing twelve shillings annually was to be entitled to a share of the collections accumulated by the agents to be dispatched by the society. If the result of one year's collecting proved below the value of the sum subscribed, the subscriber was to have a share of the gatherings of the following year. If, on the contrary, the result of the year's exploration proved more valuable than the amount subscribed, the subscriber would bind himself to pay *pro ratâ* a supplementary contribution to be applied to future explorations. The society's collectors would furnish periodical reports, and the plants gathered would be divided into bryological (including *Hepaticæ* and Ferns), lichenological, algological (including Charas and seaweeds), and mycological sets, subscribers having the choice of stipulating for whatever sets they prefer. Subscriptions may be paid to Professor Buchincher. in Strasburg, or Dr. Rabenhorst in Dresden. It would be highly desirable that the society

should appoint an agent in London, as well as in the great towns of the Continent.

The Imperial L. C. Academy Naturæ Curiosorum has conferred the degree of Doctor of Philosophy on Mr. G. H. K. Thwaites, Superintendent of the Royal Botanic Garden, Peradenia, and author of an 'Enumeration of Ceylon Plants.' We sincerely congratulate him on an honour so well deserved.

Mr. Hardwicke has in course of preparation for publication, 'Synopsis Filicum ; or, a Synopsis of all known Ferns, including Schizæaceæ, Osmundaceæ, Marattiaceæ, and Ophioglosseæ,' by Sir W. J. Hooker, in ten monthly parts, illustrated by Fitch ; 'British and Foreign Ferns capable of Cultivation in this Country,' by John Smith, late Curator of the Royal Botanic Gardens, Kew ; and 'Rust, Mildew, and Mould under the Microscope : a Plain and Easy Guide to the Study of Microscopic Fungi,' by M. C. Cooke.

Grisebach's 'Flora of the British West India Islands' is now quite completed. The second volume of Bentham's Australian Flora has appeared. Nos. 27 and 28 of F. Mueller's 'Fragmenta Phytographiæ Australiæ' have also reached us.

Dr. Schübeler, whose work on the useful plants of Norway was noticed in our last volume, has been elected Professor of Botany and Director of the Botanic Gardens at Christiania.

Mr. William Mudd, the author of the 'Manual of British Lichens,' has been elected Curator of the Cambridge Botanic Garden.

Mr. B. T. Lowne, who has accompanied the Rev. H. Tristam on his recent tour to Palestine, has brought home a considerable collection of dried plants, which he has lately been arranging and making up into sets, including small sets of "Scriptural plants."

Professor von Leonhardi, of Prague, has published in the Proceedings of the Brünn Natural History Society, a paper on Austrian Charas, of which we have seen a reprint. A revision of those plants had become necessary, since Ganterer wrote on the subject in 1847, before Alexander Braun's critical labours. Ganterer enumerated nineteen species, Leonhardi knows thirty-one, —additions made by Welwitsch, Heufler, Hausmann, and other zealous explorers,—distributing them under the genera *Nitella*, *Tolypella*, *Lynchothamnus*, and *Chara*. On the whole, the paper is satisfactory, but we should have liked to have, besides the mere synonyms, references to the works, often obscure provincial periodicals, where the names were first published.

Died at Brussels, September 1, aged sixty-one, M. Jean Kickx, Professor in the University of Ghent, known by several Cryptogamic, principally Mycological papers on the Belgian Flora.

Died, August 20, at Poppelsdorf, near Bonn, Dr. Hermann Schacht, Professor of Botany and Director of the Botanic Garden at that place. He was born near Hamburg, July 15, 1814, and commenced his career as a pharmaceutical chemist ; he was afterwards assistant to Professor Schleiden, then lecturer of botany at the Berlin University, and very recently obtained the place he has just vacated. He had long been in delicate health, having a few years ago made a voyage to Madeira to restore it, and he seems to have died from a cold caught during a recent excursion to the mountains. He was a physiologist whose services science could ill afford to lose.

Tab 24.

W. Fitch del et lith.

Vincent Brooks, Imp

LASIANDRA MACRANTHA, A NEW BRAZILIAN MELASTOMACEA.

By Berthold Seemann, Ph.D., F.L.S.

(Plate XXIV.)

We know no other *Melastomacea* with larger flowers than the one figured in our Plate, which was introduced in 1862 by Mr. J. Linden, through M. Libon, from the Province of St. Catharina, Brazil, and flowers in the autumn. It is not described in Naudin's Melastomacearum Monogr. Descript., nor contained in the London Herbaria. I therefore assume it to be new to science, as it is to our gardens, where it recommends itself by its showy purple flowers, the size of which is not in the least exaggerated in our Plate.

Lasiandra (§ Mucroriferæ b. Macranthæ paucifloræ) *macrantha*, Lind. et Seem. sp. nov.; fruticosa, erecta, ramis foliisque pubescentibus, foliis ovatis v. ovato-oblongis acuminatis denticulatis v. subintegerrimis, utrinque viridibus v. margine sanguineis, floribus terminalibus solitariis v. binis, segmentis calycinis ovatis acuminatis, petalis 5 amplis obovatis breviter apiculatis (purpureis), staminibus (10) glabris, connectivo insertione filamenti glandulifero, stylo brevi.—Prov. of St. Catharina, Brazil (Libon).

Explanation of Plate XXIV., representing *Lasiandra macrantha*, natural size, from specimens which flowered in Mr. J. Linden's garden at Brussels.

THE MISTLETOE (*VISCUM ALBUM*, L.) IN HEREFORDSHIRE.

By Henry Bull, M.D.

(Abridged from the Transactions of the Woolhope Naturalists' Field Club, with corrections by the Author.)

I. Propagation and Growth.

The mode in which the Mistletoe is propagated has given rise to much discussion. Aristotle (De Gen. Animal.) and other ancient writers imagine that the seeds will not grow unless passed through the intestines of a bird. In olden times, long before the birds had cause to dread gunpowder, the Mistletoe was the chief source of birdlime, and the Mistletoe Thrush (*Turdus viscivorus*), in thus making the

seed grow, might be said to produce the cause of its own destruction. Hence arose the proverb, *κίχλη χέζει αὑτῇ κακόν* (*Turdus cacat suum malum*), or, as the old doggrel expresses it,—

> "The Thrush when he pollutes the bough
> Sows for himself the seeds of woe."

Baudin, Scaliger, and more modern writers, have treated this view as fabulous, but committed a still greater error in fancying the Mistletoe a mere excrescence from the tree on which it grew. Virgil ('Æneid') represents them in the lines:—

> "Quale solet sylvis brumali frigore viscum
> Fronde virere novâ, quod non sua seminat arbor
> Et croceo fœtu teretes circumdere truncos."

And still later it has been supposed that the glutinous berries stick to the beaks of the birds, and as they clean their beaks the seeds are sown,—a view which supposes that the birds don't know how to eat the berries they like so much.

There is no longer any question that the natural mode in which the Mistletoe is propagated is that represented by the ancients; and modern experimentalists succeed so much better in growing the seeds the birds have thus dropped, that they seek for them, in preference to seed fresh from the plant. It is equally beyond all doubt, however, that fresh seeds will grow without undergoing any such process. The artificial propagation of the Mistletoe from the natural seeds is by no means difficult. Fasten the seeds of the berries by the glutinous matter surrounding them to the boughs of a Crab- or an Apple-tree, or a Black Poplar, and if they escape destruction from small birds, some of them will be sure to germinate and take root. Many persons however have found such difficulty in growing the seeds that the following rules are added:—Raise a considerable piece of the bark by a sloping incision, nearly an inch long, on the under side of the branch to be experimented upon: the cut should only be made through the bark itself, and not into the wood of the branch; or, more simply still, a broad notch may be cut in the bark. Then having chosen some fine well-ripened berries, open the skin of one of them, remove the seed with great care and place it in the base of the notch, with the embryo directed towards the trunk of the tree, and restore the raised bark over it. In this way it is best secured from the sun, winds, rains, and

birds. The branch experimented upon should not be less than five feet from the ground. The seeds require to be handled with delicacy; a light crush will destroy their vitality by injuring the embryo, and the pulp surrounding them is so very glutinous that it is difficult to place them right and keep them there without pressing on the seed; many experiments have doubtless failed from want of care in this respect. Some persons have used with advantage a covering of moss and bast to protect them and to keep them damp. An old tree in a damp situation will render the success of the experiment still more probable. The best time for sowing is January or February. The young plant is slow in its growth, and will spend one, and sometimes two years, in the formation of roots only. Mistletoe can also be artificially propagated by grafting or budding, and with still greater certainty by inarching. The Continental experimentalists do not find much difficulty in making the seeds grow. M. Du Hamel made a series of experiments with regard to its mode of propagation, and succeeded on all trees but the Fig, the Oak, the Hazel, and the Juniper. He could always make the seed germinate, even on earthen pots, stones, dead pieces of wood, or even upon the ground, but though the radicles would shoot out freely at first, they quickly died, showing that it was a true parasite. M. Dutrochet proved by a series of delicate experiments that Mistletoes do not obey the usual law of plants in germinating, by directing their radicles towards the centre of the earth, but always towards the centre of any object against which they are grown. He caused Mistletoe seeds hanging from threads to germinate on all sides of round balls, and in cases even when the ball was of metal, the radicles were directed towards the centre of the ball, and not towards the earth,—that is, the seeds beneath the ball directed their radicles upwards, those at the top sent them downwards, and those at the sides horizontally.

The following observations are taken from a paper by Dr. John Harley, on the 'Parasitism of the Mistletoe,' read before the Linnean Society:—

"The Mistletoe attaches itself to the nourishing plants, by roots, some of which are horizontal and confined to the bark, while the others are contained within the wood. Henslow, Griffith, Unger, Schacht, and Pitra, all agree in the following particulars:—The young plant first sends into the bark of the nourishing plant a single root, sucker, or senker, which, pressing inwards, comes into perpendicular

relation to the wood of the nourishing plant, in the cambial layer of which the point rests, and there ceases to grow. In its passage towards the wood, it gives off several horizontal or side roots, which run along the branch in the bark, or upon the surface of the wood. These side-roots give origin to perpendicular suckers, which come into contact, like the original root, with the surface of the wood. The wood and bark of the mother-plant, in their periodical increase, form layers around the suckers, which grow in exactly the same manner in the cambial stratum, (Pitra,) and thus the hardened suckers come to be embedded in the body of the wood." Dr. Harley goes on to state, amongst other particulars, that their perpendicular roots are tapering, diminishing in size from the circumference towards the centre; that there are usually three or four, and sometimes five or six of such perpendicular roots; that their terminations are always composed of delicate tubular cells joined end to end, and arranged parallel to each other and to the long axis of the root, and that these roots are always arranged strictly parallel to the medullary rays of the nourishing plant. "The young cellular root of Viscum may be regarded generally as a prolongation of the central pith of the parasite, and contiguous medullary rays of the nourishing plant are successively confluent with its surface."

Having minutely described the loose porous structure of the stem and base of the Mistletoe, Dr. Harley says, "with regard to the direction and arrangement of the roots of the Viscum which lie within the wood, this is determined by the arrangement of the medullary system of the nourishing plant, the roots always lying strictly parallel to the medullary rays;" a conclusion to which he was led by the fact, that the Mistletoe and the supporting branch grow at right angles to each other, and that on a transverse section the Mistletoe-roots are shown to be arranged like the radii of a circle from the circumference towards the central pith.

"The horizontal ramifications (side roots) of the base have plainly the same structure as the young perpendicular roots. Whichever direction they take, they produce, at frequent and pretty regular intervals, other tapering cellular roots, which, guided doubtless by the medullary rays of the bark, press towards the surface of the wood, and are thus brought in contact with the ends of its medullary rays. They are subsequently found embedded at various depths in the hard wood of the nourishing plant, like the primary roots. These lateral roots

also give origin to bud-like processes, which, deepening in colour, grow up obliquely through the bark, and appear as little shoots in its chinks, soon developing leaves and stems as a "separate plant." Dr. Harley also gives good ground for believing the perpendicular roots penetrate the hard wood by their own growth, in the absorption they occasion in the wood itself, and in the depth to which they enter,—a conclusion which all who have made careful sections of the bough with the Mistletoe attached, will have no difficulty in believing.

"When the roots of the *Viscum album*," says Dr. Harley again, "have become fairly infixed into the medullary system of nourishing plant, their outer portions become gradually thickened by the formation of woody layers upon their surfaces. This increase in the lateral dimensions of the root takes place *pari passu* with that of the branch upon which it grows; for every layer of wood deposited on the branch, a corresponding one is deposited upon the Mistletoe; and the growth of the two plants proceeding thus uniformly, the concentric rings of the stock pass uninterruptedly into those of the Mistletoe, and the woody layers become coincident. Whilst the roots thus undergo increase and lignification about their outer portions, their inner extremities which now lie deeply within the hard wood, constantly retain their original soft cellular condition; they are in fact to the *Viscum*, what the cellular rootlets of terrestrial plants are to them."

II.—TREES UPON WHICH THE MISTLETOE GROWS IN HEREFORDSHIRE.

The trees upon which the Mistletoe grows, as far as I have ascertained, are as follows:—

Apple-tree (*Pyrus Malus domestica*); throughout the county.
Abele-tree or White Poplar (*Populus alba*); not common.
Grey Poplar (*P. canescens*); rare.
Aspen (*P. Tremula*); occasionally.
Black Poplar (*P. nigra*); rare.
Black Italian Poplar (*P. monilifera*); very freely.
Canadian Poplar (*P. Canadensis*); very common.
Ontario Poplar (*P. candicans*); common.
Hawthorn (*Cratægus Oxyacantha*); not uncommon.
Crab (*Pyrus Malus*); general throughout the county.
Lime-tree (*Tilia Europæa*).
Maple (*Acer campestre*).
White-flowering Acacia (*Robinia Pseudacacia*).
Mountain Ash (*Pyrus Aucuparia*).
Ash (*Fraxinus excelsior*).
Common White Willow (*Salix alba*).
Hazel (*Corylus Avellana*).

Pear-tree (*Pyrus communis*).
Oak (*Quercus Robur*).
Alder (*Alnus glutinosa*).
Round-leaved Sallow (*Salix caprea*).
Sycamore (*Acer Pseudo-platanus*).
Common Dog Rose (*Rosa canina*).
Medlar (*Mespilus Germanica*).
Wych Elm (*Ulmus montana*).

The Mistletoe also grows spontaneously on the following cultivated trees in this county:—

Yellow Horse-chestnut (*Æsculus flava*).
Horse-chestnut (*Æ. Hippocastanum*).
Western Plane (*Platanus occidentalis*).
Eastern Plane (*P. orientalis*).
American Crab (*Pyrus Malus Americana*).
Red Swamp Maple (*Acer rubrum*).
Upright Wych Elm (*Ulmus montana erecta*).

The favourite site of the Mistletoe is the Apple-tree. There is scarcely an orchard of any standing without it, and in many it grows far too luxuriantly. The proportion of Apple-trees which bear Mistletoe in the central districts of the county, as obtained by a separate examination of more than two thousand trees, as they came, in several orchards, is as follows:—in orchards of comparatively new kinds of fruits, principally French and Italian Apples, the average number of trees which bore Mistletoe ranged from 13 to about 30 per cent.; in old long-established orchards, the proportion varied from 30 to as high as 90 per cent.; whilst the general average from all the trees marked down was 39 per cent. of Mistletoe-bearing trees. The actual numbers were 784 with Mistletoe, and 1218 without it. Nor can this very high average be an over-statement. The trees were examined after they had supplied the Christmas and New Year's Day requirements, for this and other counties, and had been subjected moreover to the usual annual pruning.

Mr. Adams, of Marden, kindly undertook to obtain a fair reliable average of the number of Apple-trees in full vigour, which bear Mistletoe in that district, and sent the result of his examination of six different orchards. There were altogether 590 trees, 222 with, and 388 without Mistletoe, or 34 per cent. of Mistletoe-bearing ones on the general average. He was careful to select orchards in which the trees had attained their full growth and were in full bearing—avoiding, on the one hand, those of very young trees, where comparatively few were affected by the parasite, and on the other, those containing very old trees, where almost all of them bear it.

It is the belief amongst orchard proprietors that the Mistletoe, when

occurring in moderation, injures neither the tree itself nor the fruit it bears, as used to be thought. It is not therefore pruned out so much as would otherwise be the case. Mr. Edwin Lees indeed thinks that the tendency in Apple-trees to form knots in the wood arises from over-abundance of sap, and that the Mistletoe relieves the tree, as cupping would do: a view so unphysiological, that I prefer the opinion of Dr. Harley, that the presence of the Mistletoe causes an increased quantity of sap to be drawn up for its supply, and thus the tree would not be much injured, so long as the soil was not exhausted.

Whether the *Viscum album* shows any preference for any particular sorts of Apples, is a point requiring further investigation. Some facts seem to show that this is the case. Some think it likes best the more acid kinds, as the varieties of the Crab, the "Old Bromley," "Skyrme's Kernel," "Hampton's Delight," etc. etc., and is less common on the "Bitter-Sweet," the "Royal Wilding," the Norman, French, and Italian fruits, and on "pot fruits" in general. Mr. Adams has observed, that trees bearing white-fleshed Apples are much more liable to be attacked than those bearing yellow-fleshed. The former correspond to the acid ones, whilst the latter embraces nearly the whole of the new and French fruits, called Bitter-sweet Apples, and from which the best and mildest cider is made. In some orchards, which I chance to know well, I observed that there is scarcely a tree, old or young, of the "Foxwhelp," "Old Cowarne Red, or Cowarne Queening, or Quining," that is not inhabited by the Mistletoe. This has been confirmed by close observers, who have added that it is the same with the "Red-streak," the "Old Styre," the "Garter Apple," the "Woodcock;" indeed with almost all the old Herefordshire apples. It is the general opinion, that Mistletoe is much less common in the orchards of the French, Norman, and Italian fruits lately so much planted: even here, though, the *Viscum* seems to make a selection, and will attack young trees of the "Upright Normandy" and "Italian Apple." Perhaps, as most of the old sorts are rapidly dying out (and the two last, though recently introduced, may belong to the same category), this parasite, as parasites in general, animal as well as vegetable, thrives best where it finds the least power of resistance. This view is supported by its greater frequency on old and cankered trees, or on those growing badly from want of drainage, or some other cause. However, all weak and decaying trees are not attacked; so that from the trees it will attack

when young and strong on one side, and those that resist it when weak and old, on the other, there seems a promising field for careful observation. Whoever may enter it, to find the secret of the requirements for Mistletoe life, or Mistletoe predilections, will have in the first place to master the confusion that prevails amongst the Apple-trees themselves, and the ignorance of their owners, as to their right names and virtues and sorts and kinds, always excepting, however, the knowledge of the quality of the cider they will make.

Next to the Apple-tree, the Mistletoe likes best the Poplars, in particular the Black Italian, Canadian, and Ontario. Here its luxuriant branches thrust themselves into notice, as well by their contrast to the tree itself, as by their lofty situation. These trees are now much planted, and no sooner do they attain any size, than a number of them become inhabited by the Mistletoe. In the central parts of the county the proportion of trees which bear the *Viscum* may be said to vary from 10 to 30 per cent., according to the age and position of the trees; but in some districts, and in some isolated groups of trees, they probably reach a still higher average. On the upright Lombardy Poplar (*Populus fastigiata*), on the contrary, there is no recorded instance of its growth in this county, nor in England, although examples have been found on the Continent. On the Hawthorn the growth of Mistletoe is widely extended, though it is much more common in some districts than in others. Mr. Edwin Lees has observed the Mistletoe to grow on Thorns, in lines extending across the country, which he accounts for by the long-observed fact, of the Fieldfares and Thrushes flying across the country in direct lines. Thorns within the line are numerously affected, whilst the Oaks and such uncongenial trees seem passed over, and the Thorns out of this line are also comparatively free. On the Lime-tree, the Maple, the White-flowering Acacia, and the Mountain Ash, the Mistletoe is not uncommonly observed,—considering the number of trees, the Maple does not seem to bear Mistletoe so frequently here as in some other districts; but the Mountain Ash seems a favourite site for it, though this tree is not very common in the county. It is singular that its growth on the Pear-tree should be so uncommon. In many works of reference this tree is placed next to the Apple as a Mistletoe-bearing tree, but in this county it is extremely rare to find it. Mixed up together so commonly as these trees are here, the absence of the Mistletoe upon it is very marked. After ex-

tended inquiries—inquiries which must have caused some thousands of trees to be examined,—the only instances in this county are on two trees at Graftonbury, one an old, the other a younger tree; and on authority which I have no reason to doubt, it is said to grow on one tree in Mr. Martin's perry-orchard at Monkhide, near Ledbury,—the only example to be heard of in this great perry-district of the county,—and at Wigmore. On all other trees it is rare. Besides the recorded instance of its growth on the Wild Rose, it formerly grew spontaneously on a Briar, with an engrafted Rose, in the garden of Thomas Cam, Esq., for many years, but was destroyed in 1860. I have also heard of another example of its growing wild on the Briar in this county at Westhide, which was unfortunately destroyed. There is little doubt that the list of trees which the Mistletoe occasionally inhabits in Herefordshire will be extended. The *Viscum album* is by no means particular in its selection of a home. I will notice all the other trees and shrubs upon which it has been observed to grow in England:—

White Beam (*Pyrus Aria*).
Buckthorn (*Rhamnus catharticus*).
Laburnum (*Cytisus Laburnum*).
Filbert (*Corylus Avellana alba*).
Catalpa (*Catalpa syringæfolia*).
English Elm (*Ulmus campestris*).
Gooseberry (*Ribes Grossularia*).
Yew-tree (*Taxus sempervirens*).
Cedar (*Cedrus Libani*).
Larch Fir (*Abies Larix*).
Walnut (*Juglans regia*).

The Mistletoe has never been observed to occur spontaneously in England, so far as I am aware of, on any of the following species, although it has been successfully propagated on several of them:—

Beech (*Fagus sylvestris*).
Birch (*Betula alba*).
Bird Cherry (*Prunus Padus*).
Wild Cherry (*P. avium*).
Sloe-tree, or Blackthorn (*P. spinosa*).

nor on any of the cultivated Cherry or Plum-trees.

Hornbeam (*Carpinus Betulus*).
Elder (*Sambucus nigra*).
Holly (*Ilex Aquifolium*).
Dogwood (*Cornus sanguinea*).
Box-tree (*Buxus sempervirens*).
Lombardy Poplar (*Populus fastigiata*).
Sweet Chestnut (*Castanea vesca*).
Laurel (*Prunus Laurocerasus*).

Why the Mistletoe should attach itself to certain trees in preference to others, is not yet solved. Popular opinion refers it to some peculiarity in the bark, and seems, oddly enough, pretty equally divided as to whether the *Viscum* prefers a smooth and hard bark, or one that is

rough and porous. Dr. Harley was led to suppose "that a difference in size, number, and arrangement of the medullary rays might explain it, and serve to determine, in any given case, the attachment of the Mistletoe;" and he, accordingly, guided by their minute anatomical structure, has arranged a list of thirty trees in the supposed order of their liability to become the site of the parasite. On dividing the list into three groups:—

The ten trees most predisposed to bear Mistletoe, and in the order in which they stand, are stated to be:—The Vine, Maple, Walnut, Elder, Holly, Plum, Acacia, Cherry-laurel, Portugal Làurel, Plum. All these are common in this county, and yet Mistletoe is only found on the Maple and Acacia.

The middle group, or those only moderately liable from their structure to bear Mistletoe, are thus given:—Hawthorn, Apple and Crab, Almond, Medlar, Lime, Olive, Ash, Poplar, Willow, Alder. This group contains all the chief Mistletoe-bearing trees, and mixed with them at least three kinds—the Alder, Willow, and Ash,—upon which it but rarely occurs spontaneously.

The group least liable to become affected by the parasite, is framed as follows:—Pear, Elm and Birch, Fir, Larch, Lilac, Oak, Beech, Spanish Chestnut, Hazel, Horse-chestnut. The Mistletoe is found in this county on three of these trees, and on the Hazel at least three instances are known, inconspicuous as it is on this tree.

Mr. Buckmann gives the following table of the comparative frequency with which trees are prone to bear Mistletoe:—the various kinds of Apple, 25; Poplar, mostly black, 20; Whitethorn, 10; Lime, 4; Maple, 3; Willow, 2; Oak, 1; Sycamore, 1; Acacia, 1 (N. & Q. iii. 226). In Herefordshire, the proportion for the Apple-tree must certainly be raised considerably, and the Acacia be put higher on the list.

It is remarkable that when the Mistletoe has once established itself on any kind of tree, and the rule holds equally good for those it but seldom inhabits, it frequently grows in several branches at the same time, as if the tree no longer possessed its original power of resisting the intruder. The tree shows it too, and soon puts on a desolate woe-begone look, with fading leaves, and dying branches. It is thought that the Limes in this condition in Datchet Mead—a place often mentioned in the "Merry Wives of Windsor"—gave Shakespeare (Tit. And. ii. 3) the illustration embodied in these lines:—

"Have I not reason to look pale?
These two have 'ticed me to this place;
A barren, detested vale you see it is:
The trees, though Summer, yet forlorn and lean,
O'ercome with Moss, and baleful Mistletoe."

Dr. Harley has well described the effects of the Mistletoe on the supporting branch, and the struggle for life between them.

III.—OCCURRENCE ON THE OAK.

The *Viscum album* but rarely "gains a settlement" on the Oak,—as seldom in our own day as in the Druidical times of old, when its very rarity heightened the veneration with which it was regarded when found. "Est autem id rarum admodum inventum, et repertum magna religione petitur," says Pliny. In an excellent note by Dr. Giles in his translation of 'Richard of Cirencester' (p. 432), he gives the opinion of Dr. Daubeny, that Mistletoe-growing Oaks were exterminated after the Druids were destroyed (N. & Q. vol. ii.). It is highly probable that this was the case, but since all their Oaks too have gone centuries since, it can make no difference as to its occurrence at the present time. Whatever may be the conditions necessary for the germination and growth of the Mistletoe on the Oak, they must be such as rarely coincide, or it certainly would be much more common in this county. Oak may be considered the weed of Herefordshire. Oak-timber and Oak-bark form two of our chief exports. Oak-woods and Oak-trees border Mistletoe-abounding orchards very generally, and the trees themselves are often mingled in very close alliance: indeed, it would not be too much to say, from the great abundance of Oaks in the vicinity of orchards, that the birds must sow the Mistletoe seeds upon them more frequently than upon any other kind of tree. Nevertheless, so far as is known, there are but two instances of its growth on the Oak in Herefordshire,—the one in Eastnor Park, which has been so well known for so many years, and the other in an outlying district of the county at Tedstone Delamere, discovered in 1851.

The occurrence of the Mistletoe on the Oak is at once so rare and so interesting, that I have not confined myself to this county in my inquiries about it, but ascertained its existence, at the present time, in all the instances which have been recorded as occurring in England. The following I have well authenticated:—

No. 1. The Oak at Eastnor.—It is situated by the side of the drive leading from the Park up the Ridgeway hill towards Malvern, about two hundred yards beyond the lodge. The Oak may be some eighty or ninety years old and the Mistletoe grows freely upon it. It is most luxuriant high up in the tree, where three large branches grow very near each other, having in each instance destroyed the bough beyond the place where it is situated. It is also growing in four other places in the tree, one fresh yearling plant shooting straight out from the main stem of the tree, about twelve feet from the ground. One large bunch of Mistletoe, growing in a large branch many feet from the main stem, was dead and decaying, but without having killed the branch. The Mistletoe plants are of both sexes, and the females bear berries freely. It is more slender, and pendulous, with smaller and thinner leaves; or in other words, it is not so stiff and rigid, and short-jointed, as it usually is when growing on the Apple-tree. During the twelve years I have known this tree the Mistletoe has increased upon it, and the Oak is already beginning to show signs of suffering severely from the parasite. Upon the large moss-covered branches it was curious to observe the great number of Mistletoe seeds which had been deposited by the birds.

No. 2. The Oak at Tedstone Delamere.

No. 3. Oak at Badams Court, Sedbury Park, near Chepstow.

No. 4. The Mistletoe is also now growing on an Oak at Burningfold Farm, Dunsfold, Surrey.

No. 5. On an Oak in Hackwood Park, near Basingstoke, Mistletoe has long been known to grow.

No. 6. The Plymouth Oak.—On recent authority, that of Mr. Edwin Lees, as quoted by Mr. T. W. Gissing in the new series of the 'Phytologist' (vol. i. p. 192), it grows in an Oak-tree not far from Plymouth, by the side of the South Devon railway.

No. 7. The Frampton Seven Oak. (H. C. Clifford.)

These are all the instances of the growth of the *Viscum album* on the Oak that I have been able to authenticate, or believe in, as existing at the present time. I fully hoped to have been able to give some examples of Mistletoe-Oaks not recorded before, but, one after the other, they failed me, and I have had, on the contrary, to reduce those before known to this small number. All the other instances recorded in books have mostly ceased to exist, either from the removal of the Oaks or the death of the Mistletoe in them.

Mr. Edwin Lees ('Phytologist,' 1851, p. 357) thinks "that Mistletoe occurs much more frequently on the Oak than is generally imagined, but that the instances are not made known." The present inquiry about it gives a result precisely the reverse. Time after time have I followed up the most precise statements, to my repeated disappointment. "The Mistletoe on the Oak," writes an energetic searcher for it in Monmouthshire, "is like a ghost, it vanishes into thin air when you try to grasp it; everybody has seen it long ago, but the tree is always cut down, or, somehow or other, the result is—*nil*." Most woodwards will tell you, and in good faith too, that they have seen it, and, indeed, will generally mention the exact tree and the place where it grows, but the result of their further examination has always been the same,—for some cause or other the instance fails, and the Mistletoe can never be shown on the Oak. The tree has been felled or blown down, or it may be the isolated bunch of wild Ivy or Honeysuckle, or a cluster of small Oak branches has deceived them.

A writer in the 'Quarterly Review' speaks of the Mistletoe as "deserting the Oak" in modern times. "It is now so rarely found on that tree, as to have led to the suggestion that we must look for the Mistletoe of the Druids, not in the *Viscum album* of our own trees and orchards, but in the *Loranthus Europæus*, which is frequently found on Oaks in the south of Europe." It seems to me that a very unnecessary confusion has *been created* between the plants, and I purposely avoid entering further into the subject for the reason given in the Review. "There is no proof that the *Loranthus* ever grew further north than at present, whilst the Mistletoe figures not only in the traditions of the Celts, but also in those of northern nations."

IV.—THE ROMANCE OF THE MISTLETOE.

"When the Romans first invaded Britain," says Dr. Henry (Hist. of Gt. Britain, vol. i. p. 136), "the inhabitants of it were famous for their superior knowledge of the principles, and their great zeal for the rites of their religion." This circumstance we learn from the best authority, Julius Cæsar, who informs us "that such of the Gauls as were desirous of being thoroughly instructed in their religion, usually took a journey into Britain for that purpose," who were themselves professed Druids. An old poem by a Celtic bard and professed Druid, the 'Chair of Taliesin' ('Kadeir Taliesin'), furnishes a long list of the apparatus requi-

site for the due celebration of the feast of Ceridwen,* and there we find the Mistletoe mentioned as one of the ingredients of the celebrated "*Mystical Cauldron*," always prepared with the most careful and elaborate ceremony. From this cauldron, *Genius*, *Inspiration*, *Science*, and *Immortality* were supposed to be derived. "It purified the votaries of Druidism for the celebration of certain mystical rites,—a flood which has the *gift of Dovydd*, or the *tree of pure gold*, which becomes of a fructifying quality, when that brewer gives it a boiling who presided over the cauldron of the *five plants*."†

There is no mention in the poem of any particular tree from which the Mistletoe was to be gathered nor of the ceremony requisite for doing so, but there can be little doubt, from other authorities, that it must have been from the Oak. "Nor must the admiration of the Gauls for the Mistletoe be unnoticed," says Pliny; "the Druids (thus they call their chief priests) hold nothing in greater veneration than the Mistletoe and the tree on which it grows, provided only that it be the Oak. They select groves of Oak-trees standing by themselves, and perform no sacred ceremonies without green Oak-foliage. Indeed, they truly believe that whenever the Mistletoe grows upon the Oak it has been sent from heaven, and they consider it a sign of a chosen tree.‡ But the Mistletoe is very rarely found upon the Oak. When it is discovered they proceed to collect it with very great devotion and ceremony, and especially on the sixth day of the moon. This period of the moon's age, when it has sufficient size without having attained the half of its fulness, makes the beginning of their months and years, and of an age, which consists but of thirty years." (C. Plinii Nat. Hist. lib. xvi. c. 44.)

* This poem, Mr. Davies thinks from internal evidence, dates "long before the sixth century," in an age when the Britons were acquainted with the Romans, but whilst Rome itself as yet was pagan.

† "*Pren Puraur*, the tree of pure gold,—the Mistletoe,—Virgil's *aurum frondens* and *ramus aureus*,—which the Arch-Druid gathered with a golden hook. Amongst the extraordinary reported virtues of this plant, was that mentioned by our bard, of promoting the increase of the species, or preventing sterility. The names of the Mistletoe in the Welsh language preserve the memorial of its ancient dignity. It is called *Pren Awyr*, the ethereal tree; *Pren Uchelvar*, the tree of the high summit; and has four other names derived from *Uchel*, or lofty." (*Davies*.)

‡ Mr. Davies, in his 'Celtic Researches,' says that "the Apple was the next most sacred tree to the Oak, and that orchards were planted in the vicinity of the sacred groves." (Mr. Lees in 'Phytologist,' 1851, p. 357.) But in his 'Botanical Looker Out' it is said, that Mistletoe from the Hazel was preferred by the Druids, next to that from the Oak, but on what authority I know not.

The grand ceremony of cutting the Mistletoe from the Oak was the New Year's Day festival of the ancient Britons, and it was held on the sixth day of the moon, as near the 10th of March as the age of the moon permitted. The New Year's Day festival of our forefathers would have fallen this present year on the 14th of March. The exact proceedings of the Druids on this great annual festival are thus described by Pliny :—"Calling the Mistletoe, in their manner of speaking, a cure-all (or all-heal), and having got the sacrifices and the good things for the feast all properly ready under the tree, they lead up two white bulls, and begin by tying them by their horns to the tree. The Arch-Druid, clothed in a white robe, then mounts the tree and cuts the Mistletoe with a golden sickle. It is caught, as it falls, in a white cloth. Then they offer up the victims as a sacrifice, praying that God would make his gift prosperous to those to whom it had been presented. They believed it would give fruitfulness to all barren animals, and would act as a remedy against all poisons." The animals were killed, cut up, and cooked ; meantime prayers were offered up, hymns were sung, and the heaven-born plant, thus carefully saved from pollution by any touch of the earth, was distributed in small sprigs amongst the people, as a sacred relic for the new year, a charm to ensure fecundity, a panacea against every disease, a remedy for poisons, and a safe protection against witchcraft and the possession of the devil. Many a good wife travelled for days, perchance, on a pillion behind her husband, through bogs and fords, and over wide tracts of uncultivated land and primeval forest, to attend this festival, leading a sumpter-horse laden with their offerings to the priesthood and all the good things they could muster for the festival,—venison and salmon, roasted bustards and boars' hams, with cakes and other delicacies, not forgetting some well-filled skins of metheglin or mead,—happy in being able, as a recompense for so much toil, to procure from the hand of the Arch-Druid, for herself and her husband, so many blessings in the coming year. The memory of the Druidical ceremonies is still kept up in Normandy, as they give Mistletoe to each other on New Year's Day, by saying, "Au gui l'an neuf," and in Picardy they add the word "plantez," to wish a plentiful and prosperous new year to each other.

The Mistletoe has entered into the mythology of other nations besides the Britons and Gauls. The fact of its great peculiarity in ripening its fruit and thus coming to its perfection in the winter solstice has

been happily rendered in Icelandic poetry, where Baldur, the Sun, is supposed to be slain by a sprig of Mistletoe, as the only plant capable of injuring him. In the poem of 'Voluspa, or Visions of Vala,' in the Edda of Sæmund, Vala tells of the death of Baldur. But the idea is more fully and beautifully expressed in the legend on the death of Baldur, given in the tale of 'The Young Norseman,' by Mr. W. B. Rands, which appeared in the 'Boys' Own Volume':*—

"More than one sword of a northern champion was named 'Mistelteinn,' after the weapon which had slain the white god. The story affords one of many points of resemblance between the mythology of Northern Europe and those of Persia and the far East. In the 'Shah Namêh,' the hero Asfendiar is represented as invulnerable, except by a branch from a tree growing on the remotest shore of the ocean. Desthân, his enemy, found it, hardened it with fire, and killed the hero. Both legends possibly refer to the 'death' of the Sun; perishing in his youthful vigour, either at the end of a day struck by the powers of darkness, or at the end of the sunny season stung by the thorns of winter." (Max Müller's 'Comparative Mythology,' in Oxford Essays for 1856.) "The 'Marentakken,' or 'branch of spectres,' which still in Holstein is believed to confer the power of ghost-seeing on its possessor, is unquestionably the true *Viscum album*." ('Quarterly Review,' vol. cxiv. p. 220.)

It is very difficult to trace down in history the customs relative to the Mistletoe after the overthrow of the Druidical ceremonies in which it played so important a part. We know that in more serious matters, —superstitions of deeper import, and more injurious tendency,—our stubborn ancestors resisted for many centuries all attempts to set them aside. This is the reason why we meet with so many edicts of emperors, and canons of councils, in the sixth, seventh, and eighth centuries, against them; even so late as in the eleventh century, in the reign of Canute it was found necessary to make the following law against these heathenish superstitions:—"We strictly forbid all our subjects to worship the gods of the Gentiles; that is to say, the sun, the moon, fires, rivers, fountains, hills, or trees, or woods of any kind. (Leges Polit. Canuti Regis, c. 5, apud Lendenbrog in Glossar. p. 1473.)

* The Mistletoe, Trefoil, Oak, and Wheat, form the Bardic emblems of the four seasons, and, as such, the Mistletoe was figured on the jewelled National Token given by the ladies of South Wales to the Princess of Wales.

It is not likely that the Mistletoe could possibly escape the effect of so much authoritative denunciation. As the object of the New Year's Day festival, it had become a sign of the religion itself; and the very mention of its name, and certainly of the virtues attributed to it with so much pomp and ceremony, would be strongly condemned. The Mistletoe, however, was not thus to be lightly set aside. Laws might denounce it as an emblem of paganism, but no power could prevent its private use. It had become a household, or rather, perhaps, a personal mark of the religious faith of the people. The belief in the chief virtue given to it so solemnly was a part of their religion itself, and the more it was denounced, the more strongly would it maintain a place in their faith. When at length the Old Style of computing time had passed away, with the Druidical priesthood and their ceremonies, and the New Style had become established, the sixth day of the moon's age must obviously have lost more and more of its significance. As the people became accustomed to the change in their New Year's Day, we can readily imagine that the Mistletoe would become associated with the change, as still the sacred charm for prosperity in the coming year, and the cherished symbol of their old festivities.

Medical writers of all times seem to have regarded the belief in the fertilizing powers of the Mistletoe as a mere fanatical superstition, and unworthy of scientific notice. Hippocrates, Dioscorides, Galen, Matthiolus, Paracelsus, Kolderer, Cartheuser, Colbatch, Loseke, Van Swieten, etc. etc., whilst they extol its virtues as a remedy for epilepsy in chief, and also for paralysis, chorea, hysteria, and other nervous and convulsive diseases, and the glutinous matter of the berries for external uses, say nothing whatever of any more special virtue. Even in epilepsy, says Pliny, "Quidam id regione efficacius fieri putant, prima Luna collectum e robore sine ferro. Si terram non attigit, comitialibus mederi" (p. 442). The real properties of the plant itself are those of a slight tonic. (Barton and Castle, 'British Flora Medica,' vol. iii. p. 146.) The leaves and shoots have an astringent and rather bitter taste, and "strong extracts made from them are nauseous, bitterish, and sub-austere." (Lewis's Mat. Medica, p. 575.) The berries are reputed to act as a purgative, and are even now sometimes given to sheep for this purpose.

In Prussia in times of great scarcity the branches and leaves of the Mistletoe have been used, says Bock (Nat. Hist. of Prussia, vol. iii.

p. 367), powdered and mixed with rye flour, to make bread, which is by no means unwholesome. In this county, before turnips were so abundantly grown, the plant used regularly to be given to sheep in frosty or snowy weather.

> "If snowe do continue, sheepe hardly that fare
> Crave mistle and ivie for them for to spare."
>
> *Tusser's 'Husbandry.'*

There can be no question, however, that the chief virtue ascribed to Mistletoe from the Oak by the Druids was the "fructifying quality," as Taliesin has it, or of "giving fertility to all animals" as described by Pliny; and it was for this virtue, when worn as an amulet, or when drunk in infusion, that the sprig of Mistletoe was so anxiously sought from the hands of the Arch-Druid on the New Year's Day festival. It is always necessary to remember this in endeavouring to trace down the domestic history of the Mistletoe in succeeding ages. It explains fully the personal hold it had gained in the esteem of the people, and its continued private use in spite of all opposition. Though books ceased to mention it, tradition would perpetuate its use, even to our own day. This peculiar virtue may perhaps serve to explain some points with regard to it, which have not been otherwise satisfactorily accounted for. "In one of Colepeper's MSS. at the British Museum, in a curious notice of Sir Peter Freschville's house at Stavely, Derbyshire, is this passage:—'Heare my Lord Freschville did live, and heare grows the famous Mistletoe-tree, the only Oake in England that bears Mistletoe.'"* And to this tree the following letter, written between 1663 and 1682, from the Countess of Danby to Mrs. Colepeper, probably refers:—

"Dear Cozen,—Pray if you have any of the Mistleto of yo^{r} fathers oke, oblidge me so far as to send sum of it to yo^{r} most affectionat servant, Bridget Danby" (N. & Q. vi. 119, 1st ser.). Let us hope that the Countess's desires were fulfilled in all respects.

It has occurred to me whether the "fructifying virtue" given to the Mistletoe by the Druids might not explain, in part, why the Mistletoe should never have been generally used in decorating our churches. As a symbol of the paganism of the Druids, its significance has passed away centuries since; and if this were the objection to its use, the Holly also should be rejected. "The Holly," says Shirley Hibberd,

* The remains of the Oak still exist, and the Mistletoe was there in 1803, but it has long since disappeared.

('Notes and Queries,' 1st series, vol. v. p. 208,) "owes also its importance in the Christmas festivities to Paganism. The Romans dedicated it to Saturn, whose festival was held in December; and the early Christians, to screen themselves from persecution, decked their houses with its branches during their own celebration of the Nativity." It may be, however, that the fact of the Mistletoe being the especial emblem of the New Year's Day festivities, has prevented its use for Christmas decoration; or it may be also, I must add, that this favourite parasite has taken too prominent a place in the rejoicings of the kitchen to secure for itself a place in the church.

For a time, indeed, it seems to have been used in decking the church, and the fact is referred to by the poet Gay ('Trivia,' Book ii. p. 437).

"It seems something like caprice," says a writer in the 'Quarterly Review,' "which has excluded the Mistletoe as well from the decorations of our churches at present as from their ancient sculpture and carvings. We know of one instance only of its occurrence. Sprays of Mistletoe, with leaf and berry, fill the spandrils of one of the very remarkable tombs in Bristol Cathedral, which were probably designed by some artist-monk in the household of the Berkeleys, whose ample and broad lands are among the chief glories of the west country, in which the Mistletoe is now for the most part found. We do not remember to have seen it elsewhere, even lurking among quaint devices of 'Miserere;' whilst the Oak, every portion of which, in the days of Celtic heathenism, was almost as sacred as the Mistletoe which grew on it, was one of the principal trees 'studied' by mediæval sculptors, when, during the so-called 'decorated' period, they reproduced leaf and flower with such exquisite beauty and fidelity: witness the Oak leaves laid into the panels of the Cantalupe shrine at Hereford, or the twisted sprays of Oak, clustered with acorns, which form one of the most graceful corbels in the choir of Exeter Cathedral." ('Quarterly Review,' vol. cxiv. p. 220.)

"Certain it is," says a writer in 'Notes and Queries,' vol. vi. p. 523, new series, "that Mistletoe formerly had place amongst Christmas decorations of churches, but was afterwards excluded. In the earlier ages of the Church many festivities not tending to edification had crept in—mutual kissing amongst the number,—but as this soon led to indecorum, kissing and Mistletoe were both properly bundled

out of the Church." (Hone; Hook; Moroni; Bescherelle; Du Cange, etc. etc.)

Mr. Edwin Lees says quaintly, "The Druids thought the Mistletoe would cure everything; we only think it worth . . . a kiss." When it received this specific valuation seems a mystery. "Why Roger claims the privilege to kiss Margery under the Mistletoe at Christmas," says the learned editor of 'Notes and Queries,' "appears to have baffled our antiquaries." Brand states that this Druidic plant never entered our sacred edifices but by mistake, and consequently assigns it a place in the kitchen, where, says he, it was hung up in great state with its white berries, aud whatever female chanced to stand under it, the young man present either had a right, or claimed one, of saluting her, and of plucking off a berry at each kiss. Nares, however, makes it rather ominous for the fair sex not to be saluted under the famed *Viscum album*. He says the custom longest preserved was the hanging up of the bush of Mistletoe in the kitchen, or servants' hall, with the charm attached to it, that the maid who was not kissed under it at Christmas would not be married in that year." (1st series, vol. v. p. 13.) Mr. Shirley Hibberd thinks this account altogether unsatisfactory. "Would it not be more reasonable," he says, "to refer it to the Scandinavian mythology, wherein the Mistletoe is dedicated to Friga, the Venus of the Scandinavians?" (Ibid. p. 208.) It seems rather doubtful whether this custom would be likely to originate in any deduction from "reason" at all, and I am quite sure the privilege could not rightly be claimed on Christmas Day. The only other suggestion that offers itself is, that tradition should have handed down this pleasant ceremony from the New Year's Day festivities of Druidical times. If it be not so, where history is silent and antiquaries at fault, we are only left to suppose the present existence of some mutual attraction,—given, the feasting and festivities below-stairs, and the conduct of Roger and Margery seems natural enough.*

Herefordshire may be considered the centre of the Mistletoe district

* Hone, in his 'Every Day Book,' relates a discussion which took place at a Christmas party, as to which might be the great and crowning glory of Christmas festivity. One said, "mince pie;" another said, "beef and plum-pudding;" some said, "wassail-bowl;" but a fair maiden blushingly suggested, "the Mistletoe." (N. & Q. vol. vi.) "But when Mistletoe is not to be obtained," says Halliwell, "*the kissing-bunch*," a garland of evergreens, ornamented with ribbons and oranges, "may be substituted for it at Christmas." (Ibid.)

of England; with Shropshire to the north, and Worcestershire, Gloucestershire and Monmouthshire, to the east, south, and west: and when, moreover, it is considered, how comparatively isolated its situation was before the introduction of railways, here we might expect to find remaining, if anywhere, the existence of a belief in its special Druidical repute, and here it still does exist, though somewhat altered in character. I have asked the question of many old agriculturists and people learned in country customs, "Is the Mistletoe ever used for any purpose now?" and the one answer I have had from every single person has been, "Yes, it is an excellent thing to give sheep after lambing," and some add, "and for cows too after calving."* I have several times been told that it must not on any account be given to them before, and know that accidents in the families of our domestic animals are sometimes attributed to its having been eaten prematurely. I may say indeed, with truth, that it is a common practice in this county now to give it to sheep at this particular time. It is true that the Mistletoe is a gentle tonic, that the animals like it, and will often eat something fresh and green when they will not take anything else, but it is very remarkable that it should only be given to them on this occasion, and never for weakness produced from any other cause. Tradition has somewhat altered its original Druidical repute if it be so, but the common practice still bears so close a relation to the "increase of the species," that I cannot but regard the general belief in its efficacy in this special way, as a very singular and interesting example of Druidical influence carried down, century after century, for near 2000 years. The fact of its taking, in our day, a somewhat modified form, only strengthens the probability that this supposition is correct.

The Mistletoe still holds well its place in the esteem of the people,

* For giving to cows, the popular belief is, that it should be gathered from the Hawthorn or Maple. It was from a woodman near Ledbury that I first heard of the continued existence of this use for Mistletoe; "Mistletoe ain't of much use now, Sir, as I knows on," said he, "except for one thing, and then it do beat everything. A piece of Mistletoe from the Haw,—from the Haw, Sir," he repeated, "chopped in pieces and given to a cow after calving, will do her more good nor any drench you can give her." And this has been confirmed from other parts of the county. Sir Thomas Browne ('Vulgar Errors,' book ii. c. 6) also states that it is a common country practice to give Mistletoe to cows at this particular time.

"A Worcestershire farmer," says Cuthbert Bede, "was accustomed to take down his bough of Mistletoe, and give it to the cow that calved first after New Year's Day, which was supposed to ensure luck throughout the year to the whole dairy." (N. & Q. iii. 313.)

if not in their veneration. There is scarcely a house or cottage in this county that has not its bunch of Mistletoe for New Year's Day. The ancient custom is still observed aright in most of the farm-houses through the county, by all the old true Herefordshire inhabitants; and especially by the lower classes. The Mistletoe-bough is cut on New Year's Eve, and hung up in state as the clock strikes twelve; the old one, which has hung throughout the year, is at the same time taken down and burnt.*

The Mistletoe does not appear to have been considered a Christmas evergreen, until the close of the sixteenth or the beginning of the seventeenth century. "We have Christmas Carols in praise of Holly and Ivy," says Timbs, ('Generally Things not Known,' 1st series, p. 159,) of even earlier date than the fifteenth century; but allusion to Mistletoe as a Christmas evergreen can scarcely be found for two centuries later, or before the time of Herrick:—

> "Down with the rosemary, and so,
> Down with the baies and mistletoe;
> Down with the holly, ivie, all,
> Wherewith ye dressed the Christmas Hall."

Coles, in his 'Knowledge of Plants' (1656), says of Mistletoe:—"It is carried many miles to set up in houses about Christmas time, when it is adorned with a white glistening berry," and in the tract 'Round about our Coal-fire, or Christmas Entertainments,' published

* "The Mistletoe-bough," says Mr. Haywood, of Worcester, "should always be gathered by the last male domestic that has entered the family. It is then dressed with nuts, apples, ribbons, etc., and suspended in the centre of the room, sometimes with a cord attached to a pulley, to allow of its being lowered for the lady to pick a berry. The berry should then be thrown over the left shoulder. I once saw, at an old mansion near Worcester, a large bunch of Mistletoe beautifully bedecked, and so cleverly suspended, that by means of strings it could be pulled to any part of the ceiling, and thus be brought over the heads of any ladies who could not be induced to go under it." The proper time for hanging up the Mistletoe, however, Mr. Haywood states, very decidedly, to be *Christmas Day*, by Worcestershire custom,—thus giving very clear proof of a border district for Mistletoe, where the true traditions with regard to it have been lost at a much earlier period than in the centre. "This is the common custom of North Worcestershire to this day," Mr. Haywood goes on to say, "and it is also usual to keep part of the Mistletoe-bough used at Christmas in the house until the following Christmas, when the new one is brought in and the old one burnt. It is said to be most wonderfully efficacious in expelling witches and keeping hobgoblins away. I knew a poor woman, upwards of seventy years of age, who walked two miles for a bit to put in some '*broathens*' for her pig, that had been bewitched by a bad neighbour. I saw her with it, and laughed at her credulity, but she was not to be shaken in her faith. I afterwards found that the pig recovered and made a good one."

early in the last century, it is said, "the rooms were embowered with Holly, Ivy, Cypress, Bays, Laurel, and Mistletoe, and a bouncing Christmas log in the chimney."

"Kissing a fair one under the Mistletoe," says Timbs, "and wishing her a happy new year, as you present her with one of the berries for luck, is the Christmas custom of our times; and in some places persons try lots for the bough with the most berries, by the crackling of leaves and berries in the fire." This conclusion is certainly inconsistent, and tends itself to prove the new-year character of the Mistletoe.

Gay's description, and many more, might be cited to show it a Christmas evergreen in later times, but it is unnecessary, since they are chiefly written by authors who were not acquainted with Mistletoe lore. They lived beyond the range of true Mistletoe customs,—where the plant did not grow naturally, or only very sparingly, and where consequently there were no traditions existing amongst the common people with reference to it. The old New Year's Day custom, indeed, is rapidly changing,—even here, in the very centre of the Mistletoe district,—and where, as I have shown, its traditions endure so tenaciously. Partly from lapse of time, perhaps, but chiefly from change of inhabitants, the Mistletoe is changing its character as a symbol of New Year's Day, to take its place with the Holly, as an emblem of the festivities of Christmas.

No man, perhaps, has done more to effect this change than he who of all modern writers would the most regret it—Sir Walter Scott. Great lover as he was of folk-lore, and the traditions of the people, he was quite ignorant of the history and legendary lore of the Mistletoe. His spirited description of Christmas-tide, in the introduction to the sixth canto of 'Marmion,' ever hangs on the memory:—

"England was merry England, when
Old Christmas brought his sports again.
. . . . . .
The damsel donn'd her kirtle sheen;
The hall was dressed with holly green,
Forth to the wood did merry men go
To gather in the Mistletoe."

Had a single sprig of Mistletoe grown in the domain of Abbotsford, we may safely say that the two last lines would never have been written. Who can wonder that lesser writers should follow in the same

track? One of these productions it behoves me to notice for the very name it bears, and the popularity it has gained, albeit the song of 'The Mistletoe Bough' does injustice to the plant itself, is a modern-antique of a mild order, and, worse than all, owes its renown and its interest to an unacknowledged plagiarism:—

> 'The Mistletoe hung in the Castle hall,
> The holly branch shone on the old oak wall,
> The Baron's retainers were blithe and gay,
> Keeping their Christmas holiday."

The burden of the song—which has made most of us tremble with horror—is the tale of Genevra, the bride, shut up in the old oak chest, from Rogers's 'Italy.'

In the midland and northern counties the Mistletoe is very rare, and it could not be expected that its traditions should be known. Nevertheless the interest in this plant is so universal, that this deficiency has been met by the improved means of transit. The Mistletoe has now actually become an established export from this county, and there perhaps never was a year when so many people rejoiced in its presence at their Christmas festivities as during that which has just passed. Through the politeness of the traffic managers for the Great Western and London and North-Western Railways at Hereford, I am enabled to give an approximation towards the correct return of the quantity of Mistletoe actually sent out of this county last December. A total of eighty-nine tons, three hundredweight, and three quarters, were actually sent off by invoice. But the guards and engine-drivers had the privilege of exporting Mistletoe on their own account, and did so by almost every train that left the county during the early part of December. An immense quantity went off in this way, and I am told that I greatly under-estimate it, when I put it down at twenty-five tons in addition,—thus making a grand total of more than one hundred and fourteen tons.

The places to which it was chiefly sent were Manchester and Liverpool, for their supply and that of towns further north, London and Birmingham. The established price paid, when delivered at the stations, was from 4*s*. to 5*s*. per cwt., according to its condition; and the average rate of charge for the transit was about £1. 10*s*. per ton; so that the whole expense of delivery may be said to be from £5 to £6. 10*s*. per ton.

I have purposely given all these details; they are distinctive of the age in which we live. It is a practical, commercial, unpoetical period, when commonplace railway trucks carry off romance—in the shape of Mistletoe—at so much per ton! Had good Sir Walter Scott lived in these days, it would never have occurred to him to send his "merry men" to the "woods" for it,—where, by the way, they would never have found it,—but the Mistletoe none the less would have reached him; and if he had chanced to look over his greengrocer's bill, he would, doubtless, have found some such items as these:—

To a bunch of Mistletoe, fine and full of berries .	£1	0	0
To pieces of ditto ditto, for decoration . . .	0	7	6

DASYMITRIUM, NOVUM GENUS ORTHOTRICHEARUM.

AUCTORE S. O. LINDBERG, M.D.

DASYMITRIUM.—*Calyptra* cucullato-dimidiata, plicata, basi integerrima, filis densissimis longis vestita, maximam partem capsulæ obtegens. *Peristomium* simplex, a dentibus sedecim incurvis, haud trabeculatis maxime papillosis, linea divisurali sat distincta donatis, formatum.—*Planta repens, ramulis brevissimis, crassis, erectis.*

OBS. Hoc novum distinctissimum genus a *Macromitrio*, Brid., *Schlotheimia*, Brid., et *Cryptocarpo*, Doz. et Molk., optime diversum est calyptra cucullato-dimidiata; a *Zygodonte*, Hook. et Tayl., calyptra plicata, dense vestita, capsula subobliqua, caule longe repente, ut et a *Drummondia*, Hook., calyptra, capsula, dentibus haud trabeculatis, crassis, densissime papillosis, etc.

1. *D. incurvum*, Lindb.—Hab. In saxis insulæ Tschu-schan (30° lat. bor.), imperii Chinensis, *Hedwigiæ albicanti* (G. H. Web., Lindb.*) associatum, anno 1862 legit navarchus Suecicus *L. Ahlström.*

* Hujus synonyma sunt:—
Vaill. Botan. Juris. p. 128, n. 3, tab. 27, fig. 18 (1727).
Sphagnum nodosum, *hirsutum* et *incanum*, Dill. Hist. Musc. p. 246, tab. 22, fig. 5 (1741).
Bryum apocarpum, β, Linn. Sp. Plant. ed. 2, i. p. 1115 (1753); *a*, Huds. Fl. Angl. ed. 1, p. 403 (1762).
B. ciliatum, Dicks. Plant. Crypt. Brit. fasc. iv. p. 6 (1801).
Fontinalis albicans, G. H. Web. Spicil. Fl. Gött. p. 38 (1778).
Hedwigia anodon, Ehrh. in Hannov. Mag. 1781, p. 1095, et Beitr. i. p. 172 (1787).

Cæspites densi, intricati, inferne fusci, superne sordide brunneo-lutei, opaci. *Caulis* longe repens, densissimas radiculas fuscas emittens, sparse foliatus; rami primarii longe repentes, secundarii stricti, subclavati, densissime et accrescente foliati. *Folia* caulina e basi ovata abruptius elongate lanceolata, ramulina majora et longiora, e basi paullo latiore sensim elongato-lanceolata, omnia oblique affixa, erecto-patentia, incurva, apice hamata profundeque cucullata, sicca crispata, apice obtusissima, margine plano vel unius lateris inferne revoluto, subplana, basi duabus plicis profundis; nervo rufo, crasso, in ipso apice dissoluto, profunde carinato, dorso valde prominente; *cellulis* omnibus incrassatis, basilaribus quadrato-rectangulis, hyalinis, inanibus, sublævibus, superioribus minoribus, rotundatis, parce chlorophylliferis, pagina utraque densissime papillosis. *Bracteæ* perichætii exteriores foliis similimæ, interiores strictæ, adpressæ, subvaginantes, ovato-lanceolatæ, abruptim cuspidatæ, cuspide obtusiuscula; nervo minus crasso, subcontinuo; areolatione nugis pellucida, lævi. *Vagina* breviter et truncate cylindrica, ab archegoniis sterilibus paraphysibusque, et brevibus copiosissimis, filiformibus, lævissimis ab una serie cellularum vix incrassatarum, et aliis longissimis paucioribus verticillato-serratis, a tribus–quatuor seriebus cellularum incrassatarum, obtecta; tubus vaginularis brevis. *Seta* bi–trilinearis, rigida, crassa, lævissima, rufula, quadrigona, leviter bicanaliculata, siccitate dextrorsum torta. *Capsula* exannulata, magna, pachyderma, ovata, leviter obliqua et incurva, brunneo-flava, ore angustiore, fusco-brunnea, sicca striata, inferne stomatibus magnis paucis rubris. *Operculum* e basi conica oblique rostratum, brunneo-flavum. *Peristomium* parvum, albidum; dentes madefacti et sicci incurvi, apicibus conniventes, lanceolati, obtusiusculi, interdum magis irregulares. *Columella* crassiuscula. *Spori** sat

H. apocarpa, Leyss. Fl. Hal. ed. 2, n. 1049 (1783).
H. ciliata, Hedw. Stirp. Crypt. i. p. 107, tab. 40 (1787).
H. diaphana, Pal. de Beauv. Prodr. p. 60 (1804).
H. albicans, Lindb. in Hartm. Skand. Fl. ed. 9, ii. p. 50 (1864).
Gymnostomum Hedwigia, Schrank, Bay. Fl. ii. p. 438 (1789).
G. ciliatum, Sw. Dispos. Musc. Suec. p. 19 (1799).
Anictangium ciliatum, Hedw. Sp. Musc. p. 40 (1801).
Schistidium ciliatum, Brid. Maut. p. 21 (1819).
Hedwigidium ciliatum, Hartm. *op. cit.* ed. 5, p. 374 (1849).
Pilotrichum (Cryphæa) ciliatum, C. Müll. Synops. ii. p. 164 (1851).

* E. Pape, Griech.-Deutsch. Handwörterb. ed. 2, ii. p. 907, radix hujus verbi est σπόρος = *semen*, σπορά contra solum est = *satio*, *procreatio*; ideoque *sporus*, *haud spora*.

magni, flavo-brunnei, læves. *Calyptra* magna, leptoderma, albido-straminea, apice brunnea, a filis paraphysimorphis flavis, flexuosis, serratis a pluribus seriebus cellularum incrassatarum formatis, vestita.—Inflorescentiam masculam invenire mihi non contigit.

Stockholm, 15 *Julii*, 1864. [*Received by us Nov.* 12.—Ed.]

ON *ACTINOTHRIX*, A NEW GENUS OF *OSCILLATORIACEÆ*, FROM THE COAST OF IRELAND.

By Dr. J. E. Gray, F.R.S.

My daughter, Mrs. Stokes, when on a visit in Ireland last autumn, sent to her mother a few specimens of *Algæ*, which she picked up on the shores of Dingle Bay, merely for the purpose of showing the very bad state in which the few weeds there were at that time. On examining them under the microscope, Mrs. Gray discovered a form which she did not recognize, and referred it to me for my opinion. After consulting various systematic works, I am induced to consider it as a new type of form among the *Oscillatoriaceæ*. The short internal joints of the filaments clearly place it in this suborder. It has also some alliance to the *Rivularieæ*, from the tapering form of the young filaments, but instead of these being united together in a solid frond, or tufted and stratified like the *Oscillatoriaceæ*, they diverge in a radiating manner from the whole surface of a small, central, solid mass. The plant was found in all states of development, intermixed with the filaments of a *Cladophora* that had been rolled into a mass on the sea-shore. In the young state, the central mass is large and the filaments very short and conical, as the plant grows they elongate and become more cylindrical, the central mass becoming relatively much smaller. As it swims about freely in the sea, it must be a beautiful object,—the young plants looking like minute green stars, and the older resembling very small medusæ or jelly-fish, with long green threads instead of arms.

The peculiarities enumerated are so remarkable that I propose to establish for it the genus *Actinothrix*, and I must consider it as the type of a new tribe *Actinothricineæ*. The genus may be thus characterized :—

Actinothrix.—Filament elongate, subcylindrical, rather flaccid,

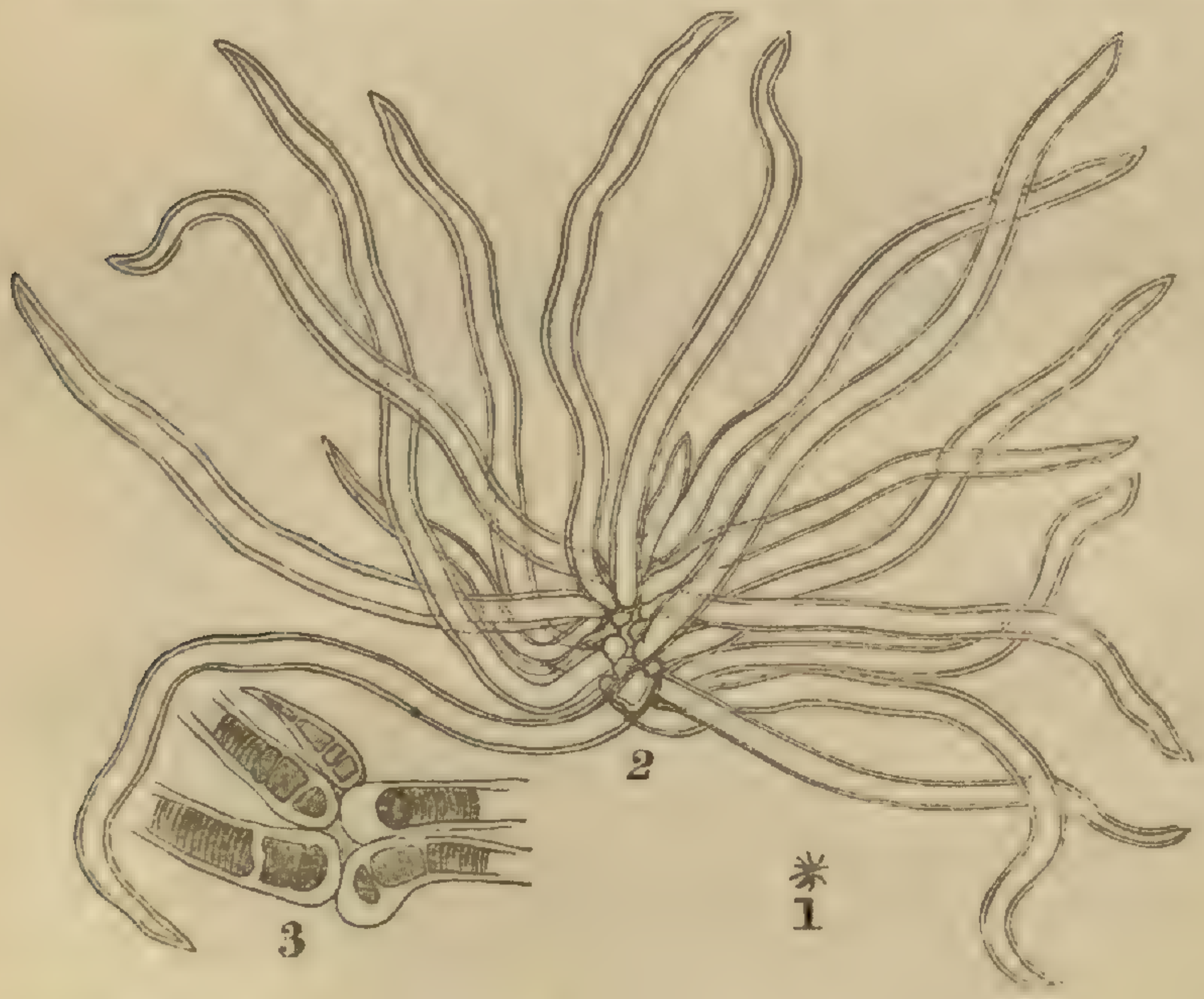
radiating from a free central mass. When young, the central mass is large and spherical, and the fibres are short and conical, giving the whole plant the appearance of a *Calthrops;* as the Alga grows the filaments gradually elongate, become more cylindrical, that is less conical and tapering, and the central mass decreases in size, until in the perfect plant the long filaments seem to spring from a small central dot. The endochrome is annulated, the rings being numerous and very narrow, looking as a series of coins arranged closely side by side would appear if placed within a glass tube.

Actinothrix Stokesiana, n. sp.; bright-green; the filaments 19 or 20 from one centre.

Hab. Ross Bay, in Dingle Bay, Ireland, among *Cladophora*. Mrs. John Stokes. August, 1864.

The endochrome is of a very bright green, and the cell-wall of the filament forms a perfectly transparent margin, external to the endochrome and continued beyond it. The longest filaments I have met with are a quarter of an inch in length.

It has been suggested that this may only be the earliest stage of



Actinothrix Stokesiana, n. sp.—1. Plant,—*natural size.* 2. Plant,—*magnified outline.* 3. Magnified fragment of the central mass, showing the method of attachment of the filaments, and the annulated structure of the endochrome. At the base of the filament the continuity of the endochrome is generally broken, one or two separate masses being almost always found there, as shown in this figure.

Lyngbya, but I do not know any species of that genus that has filaments at all like this, nor has such a development ever been observed; and I cannot believe that *Actinothrix* could ever develope into a stratified or tufted *Lyngbya*.

On communicating the description of this plant to Professor Harvey, he referred me to a freshwater Alga figured in 'English Botany.' I suppose he intended *Conferva echinulata*, plate 1378, which Agardh thinks is allied to *Vorticella versatilis*, of Müller's 'Vermes,' t. 39, ff. 13 and 17. The young state of *Actinothrix* differs from Sowerby's figure in having only a comparatively few short conical rays, not much longer than the diameter of the central mass, and in having the endochrome as in *Oscillatoriaceæ*.

British Museum, Nov. 15, 1864.

ON THE SYNONYMY OF SOME ACANTHACEOUS PLANTS.

Eranthemum Cooperi, Hook., lately figured in the Bot. Magazine, as a new speces from New Caledonia, was discovered in August, 1794, by George Forster, in Tanna, New Hebrides, and described by him in his 'Prodromus,' under n. 13, as *Justicia longifolia*. His authentic specimens, together with a coloured drawing made on the spot, are preserved at the British Museum, placing the identity of *Eranthemum Cooperi* and *Justicia longifolia* beyond a doubt. It is the *Justicia sinuata*, Banks et Sol. in Vahl, Symb. iii. p. 11; Enum. i. p. 166; *Eranthemum sinuatum*, Rœm. et Schult. Syst. i. p. 175, and the *Anthacanthus sinuatus*, Nees ab Esenb. in De Cand. Prodr. xi. p. 462. I have seen specimens from Tanna (G. Forster!, W. Anderson!) and Aneitum (M'Gillivray!, Milne!).

In rectifying the synonymy of this Acanthaceous plant, I must point out a mistake of which I have been guilty, in naming ('Bonplandia,' vii. p. 246) a new genus of *Acanthaceæ* from Brazil, of which the fruit is unknown, *Spathodea ilicifolia*. Whilst leaving Dr. Anderson to deal with this singular plant in his forthcoming revision of the whole Order, I will only add that it is identical, as I have since found, with *Digitalis dracocephaloides*, Vellozi, Fl. Fluminensis, vi. t. 101.

BERTHOLD SEEMANN.

NEW PUBLICATION.

Wissenschaftliche Ergebnisse einer Reise in Griechenland und in den Jonischen Inseln. Von Dr. Fr. Unger. (Scientific Results of a Voyage to Greece and the Ionian Islands. By Dr. F. Unger.) Vienna: Braunmüller, 1862. 8vo, 213 pp., with 45 Woodcuts, 27 Nature-printed Illustrations, and a Geological Map of Corfu.

Dr. Unger has of late years made several scientific tours to the East, and published their results. The publication before us refers to those obtained during his tour in Greece and the Ionian Islands, principally botanical and palæontological. We have a complete list of the plants collected on this occasion, containing three new species (*Silene Ungeri*, Fenzl, *Neckera Cephalonica*, Juratzka et Ung., and *N. turgida*, Juratzka), and an enumeration of the fossil flora of Kumi, in Eubœa. The latter is of special interest, and illustrated by numerous woodcuts. It comprises 56 new species, belonging to 41 genera and 29 Natural Orders, amongst which the *Coniferæ*, *Cupuliferæ*, *Moreæ*, *Laurineæ*, *Proteaceæ*, *Myrsineæ*, and *Papilionaceæ* are most numerously represented. Altogether 200 species were found at Kumi, 28 per cent. of which proved to be new. The volume, emanating from the pen of so conscientious a botanist and palæontologist, is one of permanent value.

BOTANICAL NEWS.

Dr. Forbes Watson has published a classified list of the contributions from British India and its dependencies to the New Zealand Exhibition, 1865, which seems to have been drawn up with care, and is of value to economic botanists. He enumerates about 750 vegetable substances, and gives the scientific names of the plants from which they were derived, in many cases accompanying them with explanatory notes.

In a recent issue of 'Billotia,' M. Franchet advocates the propriety of making *Lemna arrhiza* the type of a new genus, to be called *Bruniera vivipara*, and to be placed amongst *Phycaceæ*. As he has seen neither the flower nor fruit, systematic botanists will probably demur at placing a *Lemna* amongst the seaweeds.

Mr. Black's collection of Mosses has been acquired by the British Museum.

The 'Canadian Naturalist and Geologist' has lately commenced a new series, which is printed in a superior manner to the old, and is conducted with spirit. In the two numbers which have as yet reached us (nos. 3 and 4), there is one botanical paper,—Lawson on Canadian Ferns, reprinted from the 'Edinburgh New Philosophical Journal.'

The North Wales Central Botanic Gardens, Llandderfel, Merionethshire, is no pecuniary speculation, and aims at promoting a taste for gardening, chiefly among small farmers, cottagers, and the rural population generally. While the gardens of some of the wealthier classes of Wales are seldom or rarely little better than examples of ignorance, carelessness, and slovenliness, intelligence, care, and neatness are observable in some small plots attached to the farm and the cottage; it is the latter that the North Wales Central Botanic Garden desires to encourage:—1. By a gratuitous distribution of seeds and of plants. 2. By a mutual exchange with those who are able and willing to help in adding to the store of the Garden. 3. By advice and assistance in planning and managing the gardens of the small farms and cottages, and in offering suggestions, hints, and information. Visitors will be welcome to carry away packets of seeds or spare plants; and they will ever be kindly received by Mr. William Pamplin, the present occupant of the Gardens.

Died on the 21st of July last, at Havana, Fred. Ernest Leibold, whilst preparing for a botanical exploration in Yucatan. He was born on the 9th of December, 1804, at Kiel, went afterwards to the Cape of Good Hope with Baron Ludwig, and thence to Cuba and Mexico; he ultimately became a settler in Texas, till driven out of the country by the American rebellion. Schlechtendal has published some of his plants in the 'Linnæa.'

In the 'Ratisbon Flora' of September 14, Dr. A. H. Eichler, of Munich, readvocates the propriety, previously (Aug. 1) advanced in this Journal, of retaining *Trochodendron* in or near *Winteraceæ*, and at the same time he points out the differences observable in the structure of the wood of *Drymis* and the genus just named. It would be desirable to examine also the wood of *Euptelia*, to see how far that agrees with either of the two. Dr. Eichler does not seem aware, when dwelling on the differences of the wood of *Gnetaceæ* and *Coniferæ* proper, that Mr. Miers is inclined to place the former natural Order amongst the *Angiospermæ*.

We have received the following letter from an esteemed Italian correspondent:—"The Società Italiana delle Scienze Naturali was founded at Milan in 1859, originally as a geological society, but assumed its present name and proportions in the following year. Its object is the advancement of physical science in all its branches, and it numbers at present about 200 members, principally from Northern Italy, who pay an annual subscription of 20 francs and are entitled to receive the 'Atti' gratis. The society holds a monthly meeting at Milan, and has decided on convoking an annual one or *congresso* in some other town of Italy. The first *congresso* was held at Biella, in Piedmont, under the presidency of Quintio Sella, a distinguished mineralogist, and now Minister of Finance. The meeting was opened on the 3rd of September, and lasted four days. The association divided itself into three sections—zoology,

botany, and geology. The geologists were by far the most numerous and their papers the most important; next came the zoologists, and last, and I grieve to add least, the botanists. Botany is decidedly in disrepute in the North of Italy; the paid or *official* cultivators of the science are for the greater part less than second-rate, and the unpaid are too few and too far between. As an illustration of the state of things, I need only say that the most important town in that part of the country, Milan, has not one single botanical class nor a botanical garden worthy of the name. In Central Italy we are better off; at Genoa there is a flourishing cryptogamic school, founded by De Notaris, and in Tuscany a sufficient number of botanists, mostly pupils of M. Savi, at Pisa. In Southern Italy there is again a deficiency. The botanical papers read at the *congresso* were the following:—'On the Rarer Phanerogamic Plants of Biella,' by M. Zumaglini; 'On the Development of the Lichens of the Genus *Collema*,' by M. Caruel; 'On the Sexual Organs of *Verrucariæ*,' by M. Gibelli; 'On the Botanical Geography of the District of Biella,' by M. Cesati; 'On a Species of *Ascomyce*,' by M. Passerini; 'On the Botanical Geography of Upper Italy,' by M. Rostan. Next year the meeting will be held at Spezia, under the presidency of the Marquis Doria. I see by the newspapers that the 'Magenta,' which was to have made a scientific voyage round the world, has received counter-orders. Professor Parlatore is engaged in a monograph on *Gossypium*, by order of the Italian Government. The work is to be accompanied by plates executed in chromo-lithography, here applied for the first time in a scientific work. Professor Todaro, at Palermo, is going to publish on the same subject. Last year he brought out a paper ('Osservazioni su alcune specie di Cotone') in which he described no fewer than thirty-four species of *Gossypium* cultivated in his garden. M. Parlatore reduces all the species of Cotton to five. Professor Theodore Caruel has published a paper 'On the Pulp surrounding the Seeds of certain Fleshy Fruits,' illustrated by two plates. Professor Bertoloni, now far advanced in years, is working on a Cryptogamic Flora of Italy, several numbers of which have already appeared. It would have been well for Italian botany had he never undertaken a work for which he is totally unfit. He had never handled a microscope in his life, and when at the age of fourscore he procured one to study Cryptogams, it is no wonder he could not manage it properly. Of course his Flora is a complete failure, at least as regards the lower Cryptogams. *Diatomaceæ* are described as hairs growing on *Algæ*, etc.

The cyclone which lately visited Calcutta has caused much damage to the Botanic Garden, destroying many of the finest and oldest trees.

The second volume of Professor Miquel's Annales Lugd. Bat. is now being printed, and will commence with the *Anonaceæ* and *Artocarpeæ*, amongst the latter an endless series of Figs.

Dr. Milde has just completed a monograph of the Natural Order *Equisetaceæ*, which is to appear in the 'Nova Acta.'

We have seen the first part of A. S. Örsted's 'L'Amérique Centrale' (Copenhagen, folio), which is to contain figures and descriptions of the plants collected by the author in Central America, and remarks on the physical geography of that region. This first instalment contains introductory matter and eighteen well-executed plates of new or little-known plants.

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